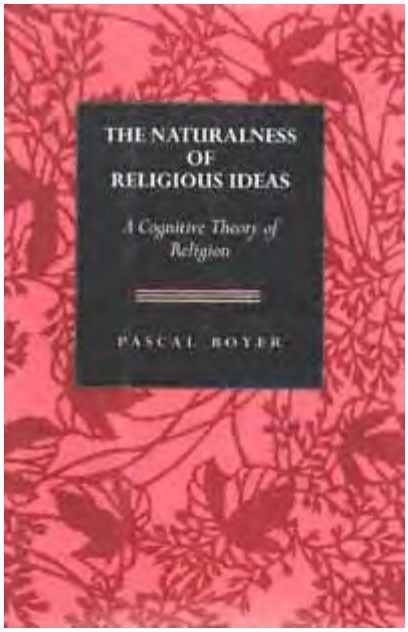

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The Naturalness of Religious Ideas

A Cognitive Theory of Religion

Pascal Boyer

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CONTENTS

PREFACE

Why do people have religious ideas at all? And why *those* religious ideas? These should be crucial questions for cultural anthropology; indeed, they are among the questions an uninformed outsider would assume are central to anthropological inquiry. As it happens, the problem is generally ignored in the discipline, though this neglect is a relatively recent phenomenon. The founders of modern anthropology had precise explanations for the appearance of religious notions. These hypotheses, however unsatisfactory, were at least a springboard for more refined speculation. Modern anthropology, by and large, is much less daring in its approach to religious representations. One is left with a frustrating choice between eclecticism and pessimism, between accepting either *all* the classical answers despite their incompatibility, or *none* of them because the question is seen as intractable. Either attitude, in my view, is an unjustifiable retreat; the discipline should either put forward some principled explanation or at least provide some coherent account of what is illusory or naive about these very general questions.

The Causal Stance and the Psychological Background

Let me formulate the question in a more specific way. We observe important recurrent features in the religious representations that

can be found in very different cultural environments. A central task for anthropology is to explain why and how these specific features are so widespread, what makes them particularly attractive to human minds. Ideally, there are many possible ways of dealing with this general question. One could follow the *theological-ecumenical* approach, which holds that the assumptions on which many different religious "systems" converge are in fact divinely inspired truths. I chose to ignore this possibility and to focus on more directly testable hypotheses. One could also take a *hermeneutic* stance and unravel the complex messages on human existence that can be extracted from religious assumptions. This approach, however, relies on dubious assumptions about the existence and contents of "metaphysical concerns" of mankind. There is just no evidence that the meaning of life and the salvation of the soul are universal themes of religious elaboration. Besides, this approach leaves the original question unanswered: Why are particular types of religious notions and claims so widespread? Since this is a "why" question, only a proper causal approach will be satisfactory.

Modem anthropology does not have much to say about the "origins" of religious ideas because it does not know how to describe the acquisition and representation of ideas in general. Although anthropological descriptions are invariably focused on ideas people have, acquire, modify, transmit, there is little consideration of the mental processes underlying such phenomena. This is all the more striking, as enormous progress has been made in related disciplines, notably in cognitive and developmental psychology, in the description and explanation of mental representations.

The main theme of this work is that important aspects of religious representations are constrained by universal properties of the human mind-brain. The tactic used throughout the book is to make use of relevant findings of cognitive psychology and more generally of cognitive science. These disciplines are used both as a source for critical evaluation of extant anthropological theory and as a springboard for renewed speculation. That is to say, I will make use of psychological data or models, first to show that the anthropological formulation of certain problems is sometimes misleading or confused, and also to suggest new approaches to the cultural phenomena considered. Some elements of the framework were presented, in a more fragmentary form, in an ethnographic monograph (1988) and a general essay on

the transmission of socially recognized truths (1990). Both represent detailed illustrations of the general points I am making here concerning the cognitive processes of cultural transmission.

The Necessary and the Contingent

In the book I explore all the consequences and possible ambiguities of a straightforward, seemingly vacuous starting point. People have religious ideas, and *those* religious ideas, because other people in their environment had them before. This may seem both trivial and unhelpful, because it states what we all know and generates an infinite regress (why then did previous generations have those religious ideas?). I will show that it is in fact neither trivial nor circular. Once we understand how mental representations can be transmitted, once we see that not all ideas can be transmitted equally easily, then we have the first elements of an explanation of religious representations. The process of cultural acquisition inevitably operates a selection in the available cultural input. The outcome of this selection is that certain features are recurrent because they are more likely to be entertained, acquired, and transmitted by human minds.

The difficulty here is to show that cultural acquisition is a *complex* process, and that we do not really know much about it. This is difficult because in this, as in many other domains of anthropological theory, research is hindered by all sorts of confused notions that conspire to persuade us that we do know how cultural representations are transmitted. *Of course* people's religious (and other cultural) representations are similar to those of the previous generations. How else could they be? People after all adopt what they find in their environment, they do not start from scratch at each generation; this much is trivial. Besides, we *know* how 'they adopt these ideas. Having heard statements and witnessed religious practices, they just imitate and thereby develop a form of adult competence similar to that of their forebears.

Let me examine more closely what is trivial or self-evident in this question, in order to give it a more precise formulation. To do this, I will consider a partly analogous domain. Most people in the world speak a natural language that is amazingly similar to the language of their peers and parents. The fidelity of transmission, in this domain, is even more impressive than in other cultural representations. The phonology, syntax, and particular lexicon, together with their inevitable consequences for conceptual structures, are reproduced in extraordinary detail. Most people find this fact unsurprising, indeed self-evident. A commonsense assumption is that children hear thousands of utterances and, little by little, learn to copy their phonological properties, syntactic structures,

and so on. The result of this massive copying operation, unsurprisingly, yields something that is very similar to the original.

This account, unfortunately, is wrong. Children's brains are not copying devices. Indeed, the child's early utterances have many structural properties that cannot be found in adult discourse. More important, however, even a copying device would need a set of strong presumptions about what should be copied and what should be ignored in the available material. In order to pick up richly structured available information, the organism needs to have substantial prior hypotheses, which focalize its attention on those structures. Precisely because natural utterances display high syntactic regularity, children will need rich presumptions to notice the fact. The moral of this example applies to religious representations as well, although the analogy should not be pushed too far. Acquiring religious representations does *not* consist in just picking up what is "in the air," as it were. The more people pick up available information from the environment, the more they are working on (and constrained by) implicit hypotheses about what is to be picked up.

The linguistic example at least highlights one major requirement for an explanatory theory. It should formulate clearly which features are contingent and which are not in the acquisition process. An eighteenth-century French aristocrat, dismayed at the difficulty of learning foreign languages, once asked why the Germans bothered to call *Brot*, and why the English called *bread*, what they all knew to be *du pain* after all. We know that, as far as language acquisition and transmission is concerned, whether you call it *bread* or *Brot* is contingent. What is not contingent, on the other hand, is

that if you are brought up in an environment where *Brot* is used, you will almost inevitably end up using that same term. This may seem trivial, but it is not. The cognitive processes underlying the early, effortless acquisition of such simple terms are complex and still not entirely understood. More complex, and not really understood at all, are the processes that underpin cultural transmission. This book is an attempt to pave the way for such an understanding, trying to sort out the necessary from the contingent in the domain of religious transmission.

What Is Not Mentioned and Why

Books seldom say everything or solve all the problems. This one certainly does neither. The aim is to sketch an approach to

religious representations that would avoid two common pitfalls of anthropological theory: first, an exaggerated belief in cultural variability, which survives all empirical evidence of the recurrence of many cultural ideas and practices, and second, a systematic, perhaps comfortable, and certainly damaging ignorance of that complex mechanism where most things cultural are located, the human mind. More positively, the point of the book is that the study of cognitive processes, however incipient in current cognitive psychology, allows us to reformulate many classical problems of anthropology and to put forward more precise hypotheses about the acquisition and transmission of cultural representations. This is not the same as saying everything or solving all the problems, but no serious theory could aim to do that anyway, since not everything is scientifically relevant, not all problems are genuine.

The argument focuses on the connection between two series of facts. On the one hand, anthropological studies show us that a number of features of religious representations recur in many different cultural contexts; we anthropologists have become so accustomed to this recurrence that we tend to view it as self-evident, whereas I will argue that it requires explanation. On the other hand, experimental psychology shows that a number of universal, richly structured, early developed conceptual principles organize our understandings of particular aspects of natural and social environments. My central claim is that the latter set of principles provide, *to a certain extent, an* explanation for cultural recurrence.

Because I focus on this question, there are many aspects of religious representations that I will not consider or try to explain here. Although it is presumptuous, and generally futile, to try and preempt criticism, I must mention some of the seemingly unforgivable omissions, in order at least to diffuse premature objections. I do not deal with "religions" understood as abstract systems of ideas which are embodied in theologies. I do not consider the historical development of such systems or their gradual change over centuries. I do not examine the political aspects of religious persuasion, transmission, and conflict, though .they are obviously crucial to a general understanding of the phenomenon. I certainly have no model or hypothesis as regards religious "experience," the various subjective, particularly emotional, states associated with religious practice, though it is a fascinating and barely understood domain.

There are three reasons or excuses for these omissions. A simple one is the optimistic assumption that there is a trade-off between depth and width, and the cognitive problems treated here do require some in-depth

analysis. A second reason is that not all aspects of religion are necessarily amenable to an integrated treatment; they may pertain to very different causal mechanisms, which should not be lumped together because they all have to do with what we ordinarily call religion. Finally, I think at least some of the questions listed above cannot be properly understood unless we have a precise description of the process and constraints of cultural transmission. In this sense, the present study aims to provide the background if not the substance of a more general study of religion.

In the same hope of deflecting criticism, I must emphasize that the examples used in the book are illustrations and nothing more. I hope they make the reasoning easier to follow, but they do not constitute arguments; they generally illustrate points that are in fact familiar to most anthropologists and not really contentious. The interpretation of those general points, however, is often at odds with common anthropological assumptions. But then it consists of hypotheses

put forward and defended on purely theoretical grounds, and it should be discussed as such.

A Map for the Reader

The argument of this book is based on a reformulation of a series of anthropological problems, which makes use of an extensive literature in cognitive psychology, particularly in the domain of conceptual development. As a result, many pages are devoted to philosophical and psychological discussions, which at first sight may seem to have little to do with the question of religious recurrence, and may also be somewhat heavy going, particularly for anthropologist readers. Some fine-grained discussion of difficult points of anthropological theory may seem recondite to psychologists. Conversely, readers from either discipline may think too much space is devoted to things they already know. These difficulties are, unfortunately, inevitable given the nature of the enterprise. I tried to alleviate the problem by summarizing the state of the argument as often as possible. As an additional help, I hope the following summary may be of help to the reader, at various points in his or her exploration, although its contents will probably appear rather mysterious at the moment:

The book comprises three parts. Part 1 sets up the general framework, anthropological and psychological, in which the question of religious

ideas should be addressed. Part 2 examines in detail the cognitive processes involved in the acquisition and representation of four different types of religious representations. Part 3 examines the consequences of these processes for the stability and transmission of religious representations.

In part 1, chapter 1 aims to show that the recurrence of certain types of representations in different "cultures" should be treated as a consequence of transmission processes, which themselves are partly dependent upon universal aspects of cognitive processes. In chapter 2, I examine whether religious representations are a specific domain and discuss various anthropological frameworks that address this question. I also try to show that religious representations in a particular given group are not all acquired and represented in the same way. They pertain to different "types" or "repertoires" of concepts, which probably have significantly different cognitive properties. This leads (among other things) to the conclusion that we cannot have a good theory of religious concepts unless we have precise notions of the processes whereby concepts in general are represented and acquired. Chapter 3 is a survey of cognitive accounts of concept-representation, which also includes some speculative hypotheses about complex conceptual structures, of which religious categories are a salient example.

Part 2 examines the different "repertoires" characterized in chapter 2, applying to each of them the hypotheses made in chapter 3. I examine the contribution of universal cognitive structures in the following domains: the representation of ontological claims about supernatural agencies (chap. 4); the causal connections postulated between such agencies and observable events (chap. 5); the conceptualization of religious roles such as shaman, priest, and so on (chap. 6); the representation of ritual episodes (chap. 7).

The cognitive constraints on religious representations have definite effects on the transmission of religious material. Chapter 8 is devoted to the ways in which people combine religious representations in what seem to be "religious systems." Also, this chapter examines the processes that lead religious believers to identify certain speakers as sources of truth, a phenomenon that was described in more detail in another book (1990). Finally, chapter 9 places the process of religious transmission in the wider context of genetic constraints on cultural acquisition, arguing that the "capacity for culture" does not consist in an undifferentiated ability to "absorb" cultural material. It comprises specific capacities, which im-

pose strong constraints on the content and organization of cultural representations.

Acknowledgments

A first version of this book was written a long time ago, of which nothing survives here, except a few passages in chapter 8. I am grateful to those who helped me carry out the original project and also to those who helped me realize how half-baked and wrong-headed the whole thing was. The first manuscript was read by Cornelia Sorabji, Michael Houseman, Carlo Severi, Tony Tanner, James Laidlaw, Carrie Humphrey, Dan Sperber, and two anonymous reviewers for the University of California Press. All their comments and criticisms were very helpful. Stanley Holwitz of the University of California Press was very encouraging and very patient; he was the first person to suggest that the book should be revised in order to address much larger issues.

Many people helped me when I was struggling with a second version. Michael Houseman and Carlo Severi were writing a book on ritual interaction, and many conversations with them helped me get the real topic of this book into focus. During that period, I had the horrifying experience of being told that another book had just come out, "on exactly the same topic seen from the same angle." Fortunately, E. T. Lawson and R. McCauley's *Rethinking Religion* was different enough and provocative enough to provide stimulating reading, and it forced me to rethink what my theory should explain. In the final phase, I was greatly encouraged by the collaborative work undertaken with Sheila Walker on the experimental study of religious acquisition. Most importantly, a major source of inspiration was the perennial, and hardly coincidental, convergence between my vague attempts and the work of Scott Atran, Larry Hirschfeld, and Dan Sperber.

I must thank those who commented on the final version: Dan Sperber, Geoffrey Lloyd, Stephen Hugh-Jones, and especially Bob McCauley, Tom Lawson, and Sheila Walker, who commented on virtually every sentence of the manuscript and would not let me get away with vague statements or pseudo-concepts. I am also very grateful to Tony Tanner for warning me against the illusion of perfection and the pathology of "Penelope's syndrome."

A final word on institutional support. When some French colleagues asked me what I was working on, I told them that it was a "general theory of religion, explained in terms of universal cognitive processes." They all laughed heartily; the hyperbole must be a joke (though not a particularly witty one). Indeed, in most academic institutions, particularly in the French ones I had to struggle through as a student, the project would have seemed crazy. I was lucky enough to work in King's College, where disciplinary boundaries were not taken very seriously, and where the boldest projects were considered worth encouraging.

ONE
RELIGIOUS IDEAS AS CONCEPTUAL STRUCTURES

1
Recurrence, Naturalness, and Under-Determination

Religious ideas can be called "natural" in (at least) two senses. "Natural" are those aspects of religious ideas which depend on noncultural constraints, like the human genome or the capacities of human brains or the properties of the world humans live in. Yet "naturalness" can be understood as describing a subjective quality, the fact that certain religious postulates are considered perfectly obvious, self-evident ideas by the people who hold them. In cultural

anthropology, the natural aspects of religious ideas, in the first sense, are generally viewed as either nonexistent or trivial, in any case irrelevant to anthropological theory. It is also generally assumed that people are led by socialization to find perfectly "natural," in the second sense, their religious systems; religious assumptions are seen as combining with other types of ideas in the seamless fabric of a worldview.

Here I will try to show, on the contrary, (1) that the content and organization of religious ideas depend, in important ways, on noncultural properties of the human mind-brain, and (2) that, despite "socialization," they are perceived as intuitively unnatural by human subjects. Religious ideas are entertained and transmitted partly because they seem intuitively unnatural to the subjects who hold them, yet the range of notions and assumptions humans are likely to include in their religious systems is strongly constrained by (noncultural) cognitive capacities. Subjective unnaturalness or oddity will be examined in chapter 2. In this chapter I will focus on the fact that some aspects of religious ideas can

be said to be natural because of the impressive cross-cultural recurrence of certain ideas and assumptions.

Although anthropology generally assumes that the systems of ideas grouped under the label "religion" are essentially diverse, a number of recurrent themes and concepts can be found in very different cultural environments. The existence of similar themes and assumptions constitutes what could be called the cross-cultural or synchronic recurrence of religious themes. Most religious systems also display an impressive diachronic stability, in the sense that they are transmitted in a roughly similar form from one generation to another. These two aspects are generally treated as relatively independent in anthropological models. Cross-cultural similarities are often treated as relatively unimportant, or as outside the scope of anthropology. They are viewed as unrelated to the transmission process, which is considered in terms of purely local mechanisms of socialization and social reproduction. The resulting picture of cultural representations that is presented by anthropological theory could be summed up as follows: two types of factors can be seen to influence the range of cultural representations people entertain at any given time in any given place. First, some universal properties of human culture (or mind, or society, depending on the theoretical framework considered); second, some particular properties of the group's history. This division is construed to be more or less exclusive (no single trait should be explained by resorting to both types of factors) and exhaustive (taken together, these two types of explanations should account for all the traits observed).

This way of dividing the problem seems to me entirely mistaken, for reasons that will be explained throughout this volume. Let me give just one argument, which at this point will have to be stated rather than demonstrated, in the hope that the rest of this chapter (and of the book) will substantiate it. The processes whereby subjects are led to entertain notions and assumptions that were already held by previous generations may well be dependent upon universal properties of culture (mind, society, etc.). Indeed, they may well depend on those very properties that account for the cross-cultural recurrence of certain non-particular aspects of cultural ideas. This may seem counterintuitive, but I will argue that this way of approaching cultural phenomena is probably more appropriate than the division described above. To take a distant analogy (which, to be sure, is certainly no argument), giraffes may be construed as similar to whales in that they need the contribu-

tions of both sexes to ensure reproduction, and dissimilar in indefinitely many other respects (appearance, habitat, diet, social behavior, etc.). However, one must remember that the reproductive processes that are common to both species are the very mechanisms whereby giraffes can produce other giraffes which will go on being very different from whales.

My attempt to explain recurrence and transmission is based on the idea that the variability of cultural ideas is not unbounded. To put things in another way, the occurrence of certain cultural notions is not entirely a contingent event. I will try to show that we can reduce the apparent contingency of cross-cultural resemblance, and that of transmission, if we take into account the fact that universal cognitive processes limit the range of variation of cultural ideas. Obviously, other types of constraints are likely to have some bearing on recurrence and transmission. I will, however, lay stress on cognitive constraints, which are both crucial and generally underestimated in anthropological theories.

Recurrence and Universals in Religious Ideas

A theory of religious ideas, like the one I will put forward in the following chapters, should account for the *recurrence* of certain religious ideas. In order to avoid premature misunderstandings, I must point out immediately that this does not imply that I am postulating any *substantive universals* in religious ideas. In most human groups one can find a set of ideas concerning nonobservable, extra-natural agencies and processes. Beyond this minimal point, however, the similarities between religious ideas are a matter of family resemblance rather than universal features. For instance, it is assumed in many (but not all) cultural environments that a nonphysical component of persons can survive after death and remain an intentional being, that is, a being with beliefs and desires. In the same way, it is assumed in many (but not all) societies that certain people are especially likely to receive direct inspiration or messages from extra-natural agencies, such as gods and spirits. Equally often (though not always), it is admitted that performing certain ritual "recipes" in the exact way and order prescribed can bring about changes in physical states of affairs. Such features are widespread in many societies, yet should not be taken a priori as universal.

Two Arguments Against Studying Recurrent Features

In cultural anthropology, the recurrence of' certain religious ideas is not explained in a satisfactory way, for the simple reason that it is not explained at all. For instance, the few features I mentioned above are well known to most students of' religion. Their recurrence in different cultures, however, is not considered an object of scientific inquiry. There are many reasons for this strange state of affairs, notably in the historical development of the discipline, which need not concern us here (see Spiro 1966 and Keesing 1985 for some comments on this point). It may be relevant to point out, however, that this topic has suffered from the combination of two fallacies. One of' them is the pretheoretical, instinctive form of relativism that is somehow intrinsic to anthropological investigation. Because anthropologists are professionally trained to detect and emphasize cultural differences, they naturally underestimate the recurrence of similar ideas in different cultures. Moreover, when this recurrence is noticed, it is often treated as a deceptive appearance, which conceals underlying differences. The assumption is that apparently similar beliefs cannot really be similar, if only because they occur in different "cultural contexts." Now this idea is vague enough to contain both a trivial truth (about the existence of differences) and a fallacy (as regards their consequences). Consider for example the widespread idea that the gods are so remote that one cannot communicate with them except through the channel of inspired mediums. Obviously, this notion can take on very different "meanings" in different societies. More precisely, it carries rather different implications for those who think that the gods have a direct influence on the well-being of the living and for those who do not. The idea that certain people are privileged "channels," however, has the same content in both contexts. We must account for the fact that this idea is so widespread, while others are not. Take, for instance, the idea that everyone can be a medium, but only every other day. Although there may well be a human group within which this is taken as a plausible hypothesis, it certainly sounds odd even to anthropologists and is certainly not a widespread religious idea. One must assume that there is a cause to this difference in spread, the cause being the same across cultural contexts. In other words, one cannot override the principle "same effects, same causes" without some strong justification.1 In the

1. In chapter 2, I will return to this point and discuss in more detail the validity of cross-cultural criteria for sameness and differences between representations.

absence of substantive evidence, there is no reason to postulate that a same idea is not the same, simply because it occurs in a different cultural setting.

Conversely, the general study of religious ideas is often hampered by the widespread idea that "human nature" is made manifest only by *universal* features of the species. What is not universal in human societies has nothing to do with human nature. One assumes that there is a division between cultural invariants, which are explainable by various noncultural factors (ecological, biological, psychological, etc.), and the rest. The cultural features that are not universal are *ipso facto* outside the influence of those various ecological, biological, psychological factors. In the case at hand, if certain traits of religious ideas are widespread but not universal, they are therefore outside the scope of a general theory of religion. This

rests on a confusion between processes and their outcome. That a universal process exists does not imply that its outcome is necessarily the same in all possible circumstances. It is precisely the point of an explanatory theory to reduce diversity and to show in what manner it results from the encounter between general mechanisms, on the one hand, and many diverse circumstances, on the other.

There are probably many reasons why these fallacies have so far thwarted anthropological theorizing. Two of these factors must be mentioned in some detail because of their relevance to the argument of this book. They concern the relationship between micro-and macro-phenomena, on the one hand, and the understanding of probability, on the other.

Relations Between Macro-Properties and Micro-Phenomena

Most anthropological theory focuses on macro-objects, such as "Nuer social structure" or "Melanesian cargo-cults" or "Navajo peyote religion." Anthropological theory aims to capture some relevant generalities about such objects. The discipline, however, has paid little attention to the difficult problems posed by the structural relationships between such macro-objects and their general properties on the one hand, and the micro-phenomena of individual cognition, emotion, or action on the other.2 Obviously, most anthropological theories imply

2. This of course is a very concise statement, which should be qualified and substantiated. Some anthropological models are in fact concerned with the relationship between

(Footnote continued on next page)

some assumptions about the connection, and most ethnographical descriptions provide suggestive illustrations of how it works in practice. It is very difficult, however, to provide a principled account of this "interface." The difficulty often leads anthropologists to rule out, as a matter of principle, all explanations of macro-properties based on features of micro-phenomena, because such explanations constitute some form of "reductionistic" explanation.

In this book I will not attempt to present a general theory of this "interface," nor will I discuss at any length the theoretical merits of "reductionistic" explanations in anthropology.3 Suffice it to say that the pervasive anthropological sentiment, following which such explanations should be excluded a priori, seems founded more on dogmatic grounds than on explicit arguments. Surely causal hypotheses, reductionistic or otherwise, should be judged on their explanatory power rather than their conformity to abstract principles. In this volume I will put forward causal hypotheses, some of which identify properties of micro-phenomena, more specifically of individual cognitive processes, as the cause of macro-phenomena, notably the recurrence of certain religious ideas. The merit of these hypotheses, if true, is to constitute sufficient and parsimonious explanations for the recurrence observed. The question of whether they are philosophically legitimate will be left aside for further consideration.

Probabilistic Occurrence and Causal Structure

Another, related reason for ignoring the recurrence of certain religious ideas may have to do with anthropology's dislike of statistics and probability, or more precisely, with its estrangement from the scientific outlook of which statistics and probability are the natural idiom. The fact that certain ideas are more widespread than others, that they keep recurring in very different cultural settings, is an intrinsically *statistical* phenomenon. What we mean when we say that the idea of privileged mediums is more common than the idea of alternate days for universal mediumship, is that the objective probability of occurrence of the former idea is higher than that of the latter, in a population of

(Footnote continued from previous page)
micro- and macro-phenomena. The point, however, is that they do not constitute important elements in mainstream anthropological practice.

3. On these topics, see Boyer 1993a.

different religious systems. The distribution is clearly not random, and we must explain why. We cannot just ignore such data, which is what the relativist stance would lead to, or limit ourselves to phenomena the probability of which equals one, as the universalist stance demands. Both attitudes are unreasonable. The fact that we start from a statistical observation, concerning the recurrence of certain ideas and the probabilistic interpretation, does not imply that we abandon the idea of universal causal mechanisms. In this investigation, as in most empirical sciences, causal laws can be and are inferred from the observation of distributions that fall between chance level and universal occurrence.

Recurrence: Generative and Selective Models

As I mentioned above, there do not seem to be any substantive universals in religious ideas, beyond the very vague notion of "supernatural" entities and agency. What we are dealing with is a repertoire of salient ideas, which tend to be found in many different cultures yet are not necessarily present in any given cultural environment. This point is important because it impinges on the format of the theory that is supposed to account for religious ideas. Also, it makes it possible to understand why certain anthropological theories are based on onto-logically dubious claims concerning the mechanisms that shape cultural evolution or transmission.

Generative and Selective Models

Here I must draw a broad distinction between two types of accounts that can be put forward in the explanation of the emergence of recurrent features in a population of organisms. I will label these accounts *generative* and *selective*. Given a series of recurrent features, a generative model posits an underlying mechanism such that, if it is present, it will provide a sufficient explanation for the occurrence of these features. Take for example the fact that, in all tigers, the anatomical structure of the retractile claws is exactly similar. A sufficient explanation of the recurrence is provided by models of genotype inheritance combined with models or embryological development. Selective models

account for recurrent features by positing (1) a set of underlying mechanisms that are necessary yet insufficient to produce the recurrence, and (2) a set of inputs such that, given the underlying mechanisms, they will produce the recurrence. This type of explanation would be necessary if we want to explain, for example, why all tigers have retractile claws, while many other mammals do not. In such a case, an evolutionary explanation will typically invoke (1) a series of random mutations, providing the input to (2) a fitness-maximizing mechanism (natural selection), the combination of which provides a sufficient explanation. The fitness-maximizing mechanism provides necessary, yet insufficient, conditions for the recurrence observed.

It is of course not accidental that the examples above are drawn from evolutionary biology, which has developed sophisticated accounts of the structure of selective explanation. However, the distinction drawn here between two types of explanations applies also outside that domain. This account is mainly inspired by D. T. Campbell's argument, that (1) one can separate the abstract structure of selective arguments from their implementation in evolutionary biology, and (2) it is possible to apply the abstract structure to problems of cultural transmission (Campbell 1960; 1970; see also Durham 1979 and Cohen 1981 for a discussion).4 This approach, of course, is not really new in anthropological theory; under the influence of Darwinian theory, many models of cultural evolution have been based on some notion of selection. There is no space here for a survey of these models (see Ghiselin 1973 and Ingold 1986, 33-47 for an analysis of these theories and the multiple misunderstandings they often produced). Suffice it to mention that, ever since E. B. Tylor's famous statement that "to the ethnographer, the bow and arrow is a species" (Tylor 1871[I]:7), metaphors taken from evolutionary theory have had a pervasive influence on anthropological thinking. Whether they led to a truly selective account of cultural recurrence, however, is a moot point.

The Selection Of Ideas

In the domain of cultural representations, the notion of a selective model means that, given certain circumstances and a variety of mental representations entertained by a population of subjects, some of' those representations are more likely than others to be stored in the

4. The precise connection between biological and cultural inheritance, and their explanatory models, will be examined in chapter 9.

subjects' memories and transmitted to other subjects. A set of constraints is posited, constraints that will make it more likely for certain representations to "survive" (i.e., be memorized and transmitted) than others.

This understanding of cultural variation and evolution is the starting point of various models of cultural transmission. An early suggestive formulation was put forward by R. Dawkins, on the basis of an analogy between the replication of *genes* (units of genetic information) and that of *memes* (units of culturally acquired information) (Dawkins 1976, 1982). According to Dawkins, evolutionary biology leads to a vision of genes as (metaphorically) "selfish" entities. They produce organisms, the main objective of which is to maximize the transmission of the genes, in some circumstances at the expense of the organism's own survival. In a similar way, units of culture could be construed as bits of information that achieve self-replication by "colonizing" human minds. Successful memes are stored in human memories in a way that ensures their subsequent communication, and consequent replication, to other minds. In this framework, such replicated memes constitute the recurrent properties of cultural material.

This type of account has led to the formulation of a number of qualitative and quantitative models of cultural transmission, all based on a selective approach to cultural phenomena. Most of these models originate in sociobiology, and as a result their main focus is not only on the structural similarities but also on the connections between the transmission of genotypes and that of cultural units. The point is to describe (1) the extent and limitations of "genetic determinism," and (2) the heuristic value of a "random variation + selective retention" approach to cultural phenomena. Such models include "cultural transmission" (Cavalli-Sforza and Feldman 1981; Cavalli-Sforza 1986), "gene-culture co-evolution" (Lumsden and Wilson 1981), "dual inheritance theory" (Boyd and Richerson 1985), and "co-evolution theory" (Durham 1991). They are based on precise hypotheses about the transmission or diffusion of cultural material, which will be discussed in more detail in chapter 9. At this stage, I will mention only some general assumptions that are particularly relevant in the study of religious ideas. The point of departure is that, given a random input of cultural traits at generation *n*, a process can be described, such that its operation on the input will increase the relative probability of certain traits appearing at generation $n + 1$ (and of course decrease the probability of other traits). Many different mechanisms can be seen to have such effects on the relative probability of different cultural traits (or sets of traits). Some of them will

be self-evident, for example, that any trait that entails the physical disappearance of generation n is unlikely to be present in later generations. Such trivial constraints aside, it becomes obvious that selective models will inevitably focus on *transmission* mechanisms as the main cause of recurrence.

Another, more specifically anthropological example of a framework based on a selective stance is D. Sperber's program for an "epidemiology of beliefs" (1985a, 1991). The argument is based on an analogy, to the effect that the relation of anthropology to psychology can be construed as similar, *mutatis mutandis*, to that of epidemiology to physiology. While physiology puts forward hypotheses about, for example, the way various viruses or germs may affect the body's functioning, epidemiology is concerned with the ways in which diseases spread. In much the same way, psychology is concerned, among other things, with the acquisition or representation of certain ideas or beliefs; anthropology specializes in observing the spread of representations. An important consequence of this notion of epidemiology is that psychological processes are directly pertinent to anthropological theory. Anthropological theories that ignore such processes are in the same situation as an epidemiological study that chooses to ignore what organs are affected and how by a particular disease. In the same way as such physiological aspects have direct consequences for the spread of a given disease in given circumstances, the psychological processes of representations and transmission are bound to affect the patterns of cognitive "epidemics."

The ideas presented in this volume are, by and large, consistent with the assumptions of selective accounts, such as coevolution theories or Sperber's "epidemiology." I will put forward hypotheses that concern only a limited aspect of cultural phenomena, and my main claim is that micro-processes of cognition and interaction impose strong constraints on the diffusion and transmission of religious assumptions, thereby leading to the recurrence of ideas observed in the religious domain.

Classical Models and The Universal-Generative Stance

The choice of a selective model is the main way in which the hypotheses that will be put forward in this book differ from what is generally understood to constitute a "theory of religion" in cultural anthropology. Many classical theories of religion are based on the idea that there are rich universals, substantive or formal, in the varieties of religious ideas described by anthropologists. The Durkheimian notion ,

of the "sacred," or the Tylorian notion of "souls," denotes cultural phenomena that are construed as universal. The hypothesis of rich universals has often led anthropologists to adopt generative models, in the specific sense explained above. They posited certain processes, either mental or social, such that their operation would be sufficient to account for the occurrence of those supposedly universal religious ideas. To mention but two examples, Durkheim saw religion as "a system of ideas with which the individuals represent to themselves the society of which they are members" (1964 [1915], 225). Religious concepts and beliefs constitute a metaphysical representation of the social order. This is why specific forms of social organization are said to lead to the adoption of specific forms of religious thought and practice. In a rather different vein, Tylor's intellectualist theory of religion posited certain intellectual needs, such that their application to natural and social situations produces religious ideas.5

The search for substantive universals is futile for two reasons: they are too vague, and we do not need them in any case. Generally, the universals that form the basis of anthropological theories are rather abstract forms of very trivial general features, which constitute the recognition criteria of religious ideas rather than a set of characteristics. Moreover, even if nontrivial universals were found, this would not necessarily entail that we should adopt a generative account. There may be indefinitely many features of human behavior and belief which are universal without being generated in the precise sense described here. They may be the outcome of situations in which the same organisms are confronted with contingently similar conditions of existence. To take a simple example, most human subjects are aware that all living beings grow and die. Their understanding of the mechanisms of growth and decay can depend on complex cognitive structures, some of which may be innate. The belief itself, however, probably is universal simply because it is true of all the living things human subjects have been able to observe so far. So the universality of a feature does not entail that a specific structure generated it.

Finally, we must notice that all the entities and properties posited in such universal- generative models have a dubious ontological status. Their

5. See Skorupski 1976 for a detailed discussion of intellectualism. What is said here of Durkheimian and Tylorian frameworks applies to more recent theoretical frameworks as well. Lévi-Strauss's structuralism for instance is based on the hypothesis of universal structural properties of cultural symbols, which are the inevitable outcome of certain properties of human minds. As E. R. Leach puts it (1976, 38), "*universal* structural characteristics of human brains are transformed into *universal* characteristics of human culture." This type of quasi-psychological hypothesis will be discussed in more detail in chap. 2.

existence or relevance cannot be demonstrated independently of the particular theory in which they are used. The Durkheimian idea of religion as the self-representation of society seems too vague or mythical to be adjudicated by any empirical data. The Frazerian, or Tylorian, account of religious ideas, which postulates intellectual "needs," would seem to be more empirically tractable, in that it refers directly to psychological processes. The latter, however, are defined in extremely vague terms. As a result, the universal intellectual needs may be construed either as a general tendency in people to produce explanatory representations of their environment or as a precise tendency to produce *supernatural* explanations. In the first case the claim is too general to account for the particular properties of recurrent features of religious ideas; in the second case the claim is circular and therefore explains nothing.6 Not to put too fine a point on it, the entities and processes postulated in universal-generative models are mostly of an *ad hoc* nature. This fact alone should compel us at least to examine alternative types of explanations.

To sum up, my starting point here is that (1) substantive universals are not necessary, (2) we are dealing with a frequency phenomenon that requires some explanation anyway, and (3) this explanation could be best provided by some account of the selection conditions that are applied to religious ideas. It remains for me to explain what selective models consist of and how they identify the causal conditions likely to generate the nonrandom frequencies observed.

Selective Constraints

The notion of *constraint plays* a central role in a cognitive account of religious ideas. Selective models are based on the assumption that a set of general constraints can be described, such that they would constitute a plausible causal explanation for the observed recurrence and the patterns of transmission. They would explain, in our case, why certain types of cultural representations are more likely than others to be acquired, represented, and transmitted. In the following pages I will survey the types of constraints which may be thought to be relevant to cultural ideas. I will then outline the general direction that a theory of religious

6. This applies to modem versions of the "intellectualist" paradigm as well. See for instance Horton's hypothesis that religious thought can be explained by the need for "explanation, prediction and control" (Horton 1982) and a critique of such claims in Boyer 1987; Boyer 1990, chap. 1; Boyer 1993a.

ideas should take, describing which types of constraints are likely to be especially important in its causal framework.

I will focus on two types of constraints, *evolutionary* and *cognitive*. Evolutionary constraints consist in those aspects of the selective pressure that can be said to have a direct effect on the range of religious ideas and practices found in human societies. Invoking such constraints implies an abductive reasoning, from the likely effect of such ideas and practices on fitness, to their being the outcome of selective pressure. Cognitive constraints are universal features of the human mind-brain, which have a direct effect on the likelihood that certain ideas will be acquired, memorized, and transmitted. Throughout this book I will argue that such factors are much more important and constraining than is usually assumed in cultural anthropology.

Evolutionary Constraints and "Non-Proximate" Causes

In the anthropology of religion, and more generally in anthropological theory, the very mention of evolutionary constraints is bound to trigger some hostility, not always of a strictly rational nature. Human sociobiology, in the demonology of cultural anthropology, is a discipline entirely founded on the unjustified extension of Darwinian hypotheses to nonbiological phenomena (Sahlins 1976). Against the evaluation of evolutionary aspects of cultural representations, it is generally assumed in anthropology that such hypotheses are to be avoided for two reasons: first, because cultural transmission has nothing to do with anything that is "genetically transmitted" and subjected to evolutionary constraints; second, because sociobiological claims are absurdly strong, in claiming that all aspects of human culture are amenable to an interpretation in terms of adaptive behavior. In chapter 9, returning to these points, I hope it will be possible to show that both arguments are unfounded, in that (1) evolutionary models are necessarily part of the background against which our hypotheses should be evaluated, and (2) the claims actually made in extant sociobiological literature are generally much more specific, and restricted in scope, than is suggested by the anthropological caricature.

At this stage in the argument I will not dwell on these questions of doctrine. I must explain, however, why evolutionary constraints will be considered only at the end of this volume, and very briefly. There are two main reasons: the insufficiency of evolutionary explanations and the

indirect nature of anthropological descriptions. Evolutionary scenarios are generally insufficient as regards the requirements of generality and specificity mentioned above. Let us suppose that some aspects of religious ideas are both extremely frequent and of a direct advantage in terms of inclusive fitness. In such a situation, a straightforward evolutionary scenario could be put forward, to the effect that selective pressure has certainly favored the recurrence of such ideas. An explanation of this type, however, necessarily involves a "black box," as far as acquisition and

transmission are concerned. That is to say, the processes whereby people's cognitive processes are mysteriously led by the "invisible hand" of adaptation are entirely bypassed. As a consequence, we are left with a plausible teleological explanation with no mechanism to explain its plausibility. This is why such scenarios, however suggestive, are of little use unless we have a plausible account of the "proximate" mechanisms whereby ideas are actually acquired and transmitted.7 Moreover, we are here talking about an imaginary limiting case, in which both the recurrence of certain ideas and their adaptive advantage are clearly established. This is a far cry from the type of situation we encounter in the actual study of religious ideas, as we will see in the rest of this book.

Another reason why evolutionary scenarios must be examined after a consideration of other, "proximate" constraints stems from the type of data anthropological descriptions produce. The fact that certain ideas are particularly recurrent in the religious systems of various cultures does not, in itself, constitute a psychological phenomenon. It constitutes only an indirect symptom of certain psychological dispositions. Surely we cannot put forward clear evolutionary scenarios, which explain why certain psychological dispositions are present in human brains, unless we have identified those dispositions. This is precisely what the examination of cognitive constraints is supposed to do.

Cognitive Constraints: Conceptul Clarifications

Cognitive constraints, the outcome of universal properties of the human mind-brain, will be the main topic of this book. That the

7. For an illustration of why proximate mechanisms should be included in evolutionary scenarios, see J. H. Barkow for instance (1984), who criticizes R. Alexander's evolutionary interpretation of avunculate (Alexander 1979) on the grounds that it in-dudes no consideration whatever of proximate mechanisms. Barkow, however, also warns against the tendency to invoke proximate mechanisms as a way of labeling rather than confronting the difficult issues of cultural transmission (Barkow 1989, 82).

general properties of human minds have some consequences for the types of representations people entertain is not controversial. The points of disagreement, between a cognitive approach to cultural material and most classical anthropological theories, concern (1) the scope and specificity of the constraints, and (2) the type of data that can be used to establish their existence.

Most anthropologists, however reluctant to introduce cognitive considerations into a theory of religion, would certainly admit that properties of the brain impose certain constraints on learning and representation. They would confine such constraints, however, to trivial aspects of the cultural material considered. For instance, there is no doubt that human minds would have particular difficulties acquiring a kinship terminology that identified more than a thousand genealogical positions. Or again, a religious system that includes more than a thousand different classes of supernatural beings, each class with its particular properties and associated rituals, would certainly overload human memory. Such constraints, however, do not provide any interesting explanation for the recurrent properties of religious ideas. Against this view of cognition, I will argue in the rest of this book that some features of the human mind impose nontrivial constraints on religious ideas. These constraints can be invoked in order to explain the likelihood that certain types of ideas, as opposed to other types, will be acquired, memorized, and transmitted.

In anthropological frameworks, it is often assumed that certain general properties of human cognition can be inferred directly from recurrent features of cultural material. In other words, in order to have a plausible description of the relevant cognitive processes, all one has to do is consider the cultural material itself and its recurrent properties. This assumption is damaging, in that it leads almost inevitably to the construction of *ad hoc* models. Many anthropological theories include implausible psychological claims, supported only by their "fit" with anthropological data. These theories are replete with terms such as "representations," "symbols," "ideas," "conceptions," "cultural models," or even "cultural theories," the status of which is rather ambiguous.8 They should not be taken too seriously as descriptive psychological terms, since they are not based on any empirical study of mental representations as such. The usage of such terms is founded on the assumption that, for every (more or less clearly defined) property of

8. For a detailed survey of such claims and their psychological underpinnings, see Boyer 1990, chap. 1; 1993a.

cultural material, there will be a special cognitive process that produces exactly that property. Here, on the contrary, I will start from the assumption that the cognitive constraints should be established independently. If we consider that the recurrence of a certain feature in cultural representations can be explained by cognitive constraints, we must have some evidence, outside the cultural material in question, that those constraints really exist. This in a way is a consequence of the simple principle that independent variables should be, precisely, independent.

The identification of cognitive constraints requires that we make a principled distinction between *performance*, *capacity*, and *function*. The performance of a cognitive system is an identified pattern in the way it handles particular kinds of information. Discriminating between circles and triangles or remembering the names of the different gods of the pantheon or parsing sentences of a natural language can thus be identified as different kinds of performance. A capacity is an underlying disposition that makes actual performances possible but could also result in indefinitely many other types of performance. Finally, a function or functional capacity can be characterized as a capacity that would not be present in the system considered if it did not result in the observed performance. These distinctions are important because the taxonomies of performances, capacities, and functions may not be entirely congruent. That is to say, it would be wrong to think that for each type of performance observed, a special capacity is involved; in the same way, one should not consider a priori that all capacities are among the functions of a cognitive system. Let me illustrate this with simple examples. All normal human subjects are remarkably good at recognizing different faces and remembering them for a long time as well as differentiating between them. This performance could be the outcome either of general capacities for visual discrimination and memorization or of a specialized face-recognition capacity. The latter hypothesis seems more plausible for two reasons. First, people are markedly better at recognizing and memorizing faces than any other type of visual stimuli. Second, some forms of brain damage result in the selective impairment of face-recognition performance, while performance on other visual stimuli is not affected; this indicates that dedicated neural structures are involved in this performance. So in this case a particular performance seems indeed to stem from a particular capacity. The capacity itself may or may not be a function. Evolutionary considerations tend to suggest that it is a genuine function of human mind-brains. Differentiating and recognizing different individuals are of demonstrable adaptive value for animals engaged in complex social in-

teraction. This is a case in which identified performance corresponds to a capacity that happens to be a function of the human mind.

In most cases, however, the identification of capacities and functions underlying performances will be far more complex. Take for instance reading as the performance. It certainly corresponds to a particular capacity (to identify visual stimuli as equivalent to uttered sentences). The capacity, however, is certainly not a function; human minds were not designed by evolution to be able to read. The particular capacity, in this case, is the outcome of the availability of a set of functions which, by themselves, have nothing to do with reading as such, notably the capacity to parse natural language and the capacity to remember a certain number of paired stimuli, in this case visual and phonological.

As for cultural representations, the situation is likely to be even more complex in the sense that an observed type of performance does not necessarily correspond to a particular capacity. A computer user trying to "undo" some of the commands she or he typed in a program and a Melanesian navigator using astronomical reference points to steer the most direct course to a remote island may seem engaged in very different performances. Both subjects, however, may be using an underlying capacity to construct and modify mental maps, in one case a map of the "tree" of possible choices and past actions taken, in the other a map of the relative positions of stars, planets, and islands. Our classification of performances is often a commonsense taxonomy, based on the type of objects handled, actions produced, or information processed. Different categories in this nontheoretical taxonomy may well involve the same capacity, and conversely, a single performance may involve several different capacities. In the following chapters, we will see all the theoretical difficulties generated when anthropological theories ignore these distinctions. Acquiring and transmitting religious representations may constitute a particular type of performance; this does not imply that the performance involves a particular set of capacities. Moreover, the real capacities involved in acquiring religious representations do not all correspond to functions of the human minds; they may well be by-products of the functional capacities.

Multiple Constraints and Causal Theoris

Obviously, the acquisition and transmission of cultural representations is likely to be influenced by indefinitely many factors

that pertain to neither the evolutionary nor the cognitive constraints described above. Among these, one may for instance identify interactional factors, which have to do with the types of interaction that can be found in human environments. Cultural representations are acquired in the context of social interaction, so it may seem that some universal features of interaction between humans will play a role in the selection of religious representations. Interactions are themselves influenced by broadly defined ecological factors, in which we may include all the material aspects of the environment that make particular types of social interaction possible. Most importantly perhaps, distributional factors will be crucial in the recurrence of certain types of cultural representations. So far, we have considered constraints that would apply even in the imaginary limiting case in which the cultural input given to individuals was totally random. In such a case, the combination of evolutionary and cognitive constraints would favor the transmission of certain traits rather than others. Now this situation is obviously an idealization, and the cultural input is never a random accumulation of cultural traits. The acquisition of a certain set of cultural representations may be constrained by certain features of the ways in which it is distributed in the population.

These different types of factors will not be considered in the following chapters. The reason for focusing on evolutionary and cognitive constraints, and for putting much emphasis on the latter, is a simple consequence of the particular problem I will address here. The point of the present theory is to put forward a series of causal hypotheses to account for the recurrence of particular cultural phenomena. Producing a causal hypothesis means isolating a central cause from a background of conditions. This does not mean that the other conditions are not causally related to the phenomena considered; it means their connection is not relevant to the particular aspects we want to explain. Giving a causal model, therefore, implies sorting out the necessary from the contingent. This partition is relative to particular explanatory needs. To take a simple example from H. Putnam (1983, 12), the presence of oxygen on Earth may be identified as the "cause" of a forest fire, if one compares it to the nonoccurrence of such events on Venus. But if one compares the occurrence of a fire in Yellowstone to its nonoccurrence in the Sahara desert, the presence of oxygen, though still among the background conditions, cannot count as the cause. This relativity does not imply, however, that causes are relative to the explainers' interests or preferences. Once the particular aspect to be explained is selected, true causes

and mere background conditions can be identified. All these are familiar and elementary philosophical points.

In cultural anthropology, however, these points are often forgotten. As a result, anthropological theories are sometimes based on a very imprecise formulation of what is to be explained. This is for instance the case when a particular argument is presented as a theory of "myth," of "religion," or of "social exchange." These are broadly delineated classes of phenomena, not features to be explained. There is also a tendency to conflate all the conditions of a phenomenon, ignoring the difference between causes and background conditions. Theories that focus on one particular set of conditions are deemed to "ignore" all the other conditions and to be excessively "reductionistic." Obviously, these three aspects of anthropological thinking are interrelated. If we consider that "myth," for instance, is the proper object of a theory, then we are likely to consider all conditions as equally important to its description and to reject causal hypotheses as only partial explanations. Domains like "religion" or "myth" or "social exchange" are not the proper subject matter of any causal theory, and thus arguments grounded in each of these domains are equally fallacious. One could not "explain" them anymore than one can explain giraffes or nebulas. Yet the narrative structure of myths, for instance, or the unbalance of particular exchange patterns, are proper objects of causal investigation, just as the feeding habits of giraffes or the particular density of nebulas may be.

Cognitive Constraints and Cultural Acquisition

It should be obvious now that the questions of recurrence and transmission are two facets of the same problem. This, in a

way, is a direct consequence of the adoption of a selective model. The fact that a certain cultural trait is particularly frequent in different cultures can be seen as the outcome of a process that increases its likelihood. Obviously, the main candidate for such a process would be a mechanism that makes it more likely that the cultural trait in question is transmitted. The questions of recurrence and transmission are therefore the same problem, viewed from different viewpoints. This is why our inquiry into cross-cultural recurrence must examine in some detail anthropological views on cultural transmission.

"Culture" As Culturally Transmitted: A Common View

Cognitive constraints are rarely mentioned, let alone explained, in anthropological theories. This is because cultural anthropology generally assumes a commonsense, implicit view of cultural acquisition which is theoretically insufficient and conceals many important problems. I will call this view the theory of "exhaustive cultural transmission." The main assumption is that the anthropologically relevant aspects of the representations adult, competent members of a group entertain are entirely determined by what was given to them through cultural transmission. This is very much what is implied by recurrent elements of anthropological phraseology such as "cultural construction." What is studied by anthropologists is supposed to consist of representations created by human groups, in the absence of any relevant cognitive constraints.

This conception of cultural acquisition, which constitutes what M. Bloch calls the "anthropological theory of cognition" (Bloch 1985), is often taken for granted in anthropological theories. The main point of this theory is that people brought up in a culture are given a ready-made conceptual scheme, which is absorbed, as it were, in a mysterious way that is never described. This "theory of cognition" includes two particularly implausible assumptions. One is that cultural transmission is, by and large, a *passive* process. Minds are conceived as containers of ideas, which are more or less empty at the onset of cultural acquisition and are gradually filled with whatever ready-made products are given by "the culture." The other assumption is that this filling process is *simple*. On both counts, however, all psychological studies of concept acquisition or belief fixation, even in simple domains, tend to show that this passive and simplistic account of acquisition is obviously insufficient. The "anthropological theory of cognition" is posited rather than defended, and the authors who set great store by such notions as "cultural construction" seldom mention the actual processes, notably the cognitive processes, whereby subjects can acquire and represent such constructions. Common intuitions in this domain seem to stem from two main factors: the complexity of cultural transmission on the one hand, and commonsense notions of cognitive development in general on the other.

The transmission of cultural representations is, obviously, a complex process. It can be described as complex on at least two different dimensions. First, cultural representations are transmitted in a variety of

formally different ways: by tuition, by implication, by direct example, and so on. Second, the acquisition process, in most domains for most human groups, is not limited to a relatively circumscribed set of social situations. Unlike the acquisition of Latin in the Middle Ages or higher mathematics in modern societies, the acquisition of cultural representations in general is more often than not diffused in a great variety of situations of social interaction, in which subjects are led to acquire or modify some aspects of their religious ideas. This twofold complexity is the main reason why we generally feel justified in saying that most important aspects of a cultural phenomenon are culturally transmitted, even if we do not have a complete account of cultural transmission. That is to say, we assume that cultural transmission is so rich and complex that it probably includes some process, which may be difficult to pinpoint, whereby an idea that was "in the air" got transmitted.

Another intuitive element supports the anthropological conception of "exhaustive cultural transmission." Our commonsense notion of cognitive development is generally characterized by a strong empiricist bias. That is to say, we tend to think that the processes whereby children gradually acquire adult competence, in most cognitive domains, is mainly driven by experience. Subjects memorize observational data and use recurrent features in those data as the starting point in the elaboration of abstract hypotheses. These hypotheses themselves are modified on the basis of further

experiential data. Cognitive growth, in most of its important aspects, is described as the accumulation of data, combined with the resulting accumulation of gradually more refined hypotheses. For instance, we tend to think that children acquire a concept like CAT by being shown exemplars of the species and by making general hypotheses on the basis of the recurrent features of the observed sample of cats. Obviously, the commonsense conception leaves some space for direct tuition as well.

Both intuitive factors give apparent support to the theory of "exhaustive cultural transmission." The intuition of complexity makes it possible to posit that all important elements of a cultural system are transmitted through social interaction, although we do not have a psychologically explicit description of the actual process of transmission. The commonsense empiricist view provides an idealized scenario, describing how this process could take place in general. The common conception of cultural transmission is both simple and intuitively plausible. It is, however, nothing more than that, and conceals some important conceptual difficulties.

Some Difficulties With The Common View

To begin with, the statement that "adult religious representations are the outcome of cultural transmission" is ambiguous. It could mean simply that cultural transmission is a *necessary* condition for the content and organization of adult representations. This much is obvious, in that no child can be expected to develop cultural representations unless he or she is brought up in some cultural environment where they can be found. The conception of "exhaustive transmission," however, goes further and entails that cultural transmission is a *sufficient* condition for all the important properties of adult representations. The common anthropological conception does not have enough theoretical justification or empirical support to make this claim.

Let me first deal with the question of complexity in transmission. Most anthropologists admit that very little cultural material is transmitted through explicit tuition. The development of schooling and the consequent extension of the domains transmitted by tuition do not obliterate the fact that, even in modern Western societies, a substantial part of what is acquired is not transmitted in such situations. This is why anthropological models of socialization assume that most of the ideas are transmitted in an *implicit* manner. To take the case of religious ideas, where such processes are particularly clear, people are seldom given "lessons" on ghosts and spirits, but they gradually form some representation of these entities, from the material that is given indirectly in social interaction. Subjects do not need to be told that witchcraft is something against which one should get some protection. From the variety of situations in which witchcraft is mentioned, they can easily derive that inference, by a simple generalization based on numerous confirming instances.

However reasonable it may seem, this idea of implicit transmission is particularly unclear. People can certainly learn a great deal by implication; unless we have a description of the specific mental processes that make such learning possible, however, we are left with no account of cultural transmission at all. This is where the empiricist scenario sketched above is insufficient, for familiar reasons that in fact apply to all empiricist accounts. We generally tend to assume that learning is an inherently simple and well-understood process. A variety of stimuli offer a number of recurrent features, which subjects tabulate and about which they can formulate generalizations. No cognitive system, however, could achieve

this without being equipped with cognitive capacities that make it possible first to isolate that series of stimuli as, precisely, a series, and then to narrow down the number of possible interpretations that can be given for any recurrent feature. The variety of situations that a subject experiences supports indefinitely many possible inferences, of which only a small subset are ever entertained by the subject. Unless we have a good description of the mechanisms that constrain the range of hypotheses, the empiricist account is insufficient.

Obviously, this familiar objection is taken into account in serious empiricist theories, and it is countered with an equally familiar argument, namely that generalizations over a series of data are constrained by former generalizations. The inductive process, which first focuses on sensory data, takes gradually more abstract objects as its domain of application. Once subjects have learned that "all cats have legs" and "all goldfish have fins," they are led to the more abstract generalization "all members of a species have similar external features." As we will see below, this counterargument is

less than satisfactory in many domains of conceptual development.9 For the time being, let me just identify a simple consequence of these remarks. In order to have an empiricist theory of cognitive development, in any domain, we must have a precise account of the way inductive generalizations are actually constrained by former, lower-level generalizations. In the absence of such a description, we have only a magical explanation, which posits that the data of experience will, somehow, generate explanatory hypotheses out of themselves.

Anthropological accounts of cultural transmission are more often than not quasi-magical. They assume that exposure to cultural material will somehow generate, in the subjects concerned, the very representations that seem to inform adult competence. These representations, however, could not be extracted from the material unless the subjects had some way of limiting the range of possible hypotheses. This point should be particularly clear to anthropologists. After all, their empirical work consists, precisely, in uncovering the representations that inform competent behavior in a culture, which is never an altogether simple task. It is then all the more damaging that anthropological theory provides no description of the ways hypothesis formation is actually constrained in cultural acquisition.

9. To pursue this particular example, it is quite clear that children need some concept of structural similarity in order to attend to features such as fins and legs *as elements of a potential class of stimuli*, rather than to other observable features.

An Alternative Account: Under-Determination

From the perspective of psychology, the commonsense empiricist account does not seem as plausible as anthropological theory would assume. In most areas of cognitive development which have been studied experimentally, the empiricist model has been shown to be insufficient. In various ways, psychological theories had to complement it with various nonempiricist models. Here I will only sketch this general alternative to the empiricist account. A more detailed examination of its models, and its consequences for cultural anthropology, will be found in part 2 of this book. The common feature of all these models is the assumption that prior cognitive structures orient the subject's attention to certain aspects of the available stimuli and narrow down the range of possible generalizations. Some aspects of these constraints cannot be directly derived from the experienced stimuli; on the contrary, they are a necessary condition, if the experience in question is to have any cognitive effects at all.10 Some of these constraints are maturational properties; they are the direct consequence of genetically constrained properties of the mind-brain. Others are particular effects of these genetic constraints. The fact that certain structures are inevitably present in normal minds has direct consequences for the appearance and development of further cognitive structures. In such models, experience is seen as providing a series of cues, which trigger cognitive development. The triggering process does not occur unless the developing mind has the means to isolate and identify the cues; furthermore, the developmental sequence that is triggered is already constrained by cognitive structures, not by experience.

The first and main reason for positing prior, non-experience-driven cognitive structures is the argument of *under-determination*. It consists in showing that the information available to the learning subject, in a certain cognitive domain, is insufficient to infer the principles that govern adult competence. The input is amenable to indefinitely many structural interpretations, on the basis of which a simple inductive machine, tabulating recurrent patterns, could produce irrelevant principles. It must be noted that under-determination arguments, by themselves, do not entail that the cognitive structures in question are necessarily *innate*. They only entail that the acquisition process, for a certain cognitive

10. This, obviously, is a very old philosophical point; here, however, I will mention only its experimental vindication in cognitive psychology.

domain, is constrained by structures that are already present, when or before that domain is acquired. Whether these structures are direct or indirect consequences of genetic traits is an independent question.11 Second, the thrust of the under-determination argument is not just to show that there are some prior cognitive structures in all domains of learning; this much would be assumed in any realistic account of cognitive development, even in empiricist models. The point of

the argument is to show that these prior structures impose strong constraints on learn-ability, and therefore they can account for nontrivial properties of the mature state.

An Empirical Choice

In the empiricist view, experience-driven generalizations are sufficient to produce mature competence. In the alternative account, prior cognitive structures constrain a developmental sequence that is triggered by experiential cues. In its description of cultural representations, anthropology has generally chosen the first alternative. This choice, however, is not generally founded on theoretical arguments but rather on intuitive views of development. This is why it is at least legitimate to ask whether this classical account is theoretically sound and supported by adequate empirical evidence.

The implicit empiricist view may derive some of its persuasive power from the fact that the actual cognitive processes underlying cultural transmission are not really examined at all in anthropology. This, obviously, makes it difficult to examine the problems generated by empiricist models. It takes a certain sophistication in linguistic theory to realize that the acquisition of syntactic structures cannot be just a process of trial and error, whereby the child tries to build sentences by imitation and modifies them to take into account the adults' corrections. In the same way, the commonsense notion that children acquire cultural representations merely by being subjected to many situations of interaction, and by making inductive generalizations on that basis, may well be over-simplistic.

11. Thus, some linguists can agree with Chomsky that linguistic input under-deter-mines syntactic structures and yet refuse that the prior structures are innate. They may for instance assume that they are the result of the development of "general intelligence," or of specialized cognitive capacities in domains other than language (e.g., sensorimotor intelligence in Piagetian models). This possibility is explicitly considered by Chomsky and rejected because the proposed structures are too vague to be of any explanatory value (on this debate, see Piatelli-Palmarini 1980).

How could the issue be settled? Rather than provide arguments for either of the alternative accounts, the above remarks were meant to suggest (1) that any choice in this domain should be explicitly defended, rather than accepted uncritically, on the basis of intuitions, and (2) that the choice is an empirical matter. Whether either account is satisfactory in a given domain of cognitive development cannot be established unless we have a precise description of the mature representations and of the acquisition process. Because the question is an empirical one and depends on the type of competence one is considering, it is rather unlikely that one of these accounts will turn out to be generally valid for cognitive development as a whole. Mature cognitive capacities are very diverse, and it is more than plausible that different capacities are acquired in different ways. Moreover, what appears, on the surface, to be a single cognitive capacity may in fact imply different cognitive systems, which are not acquired in the same way.

Cognitive constraints will be the subject matter of part 2 of this book, in which I will try to argue for the "prior structures" account outlined here. I will argue that the cultural material that is given to subjects through social interaction may be said to under-determine adult religious ideas. The only way fully to account for adult representations is to posit some preexisting cognitive structures, which constrain the learn-ability of religious ideas. This hypothesis goes against the grain of mainstream anthropological theorizing. Religious systems seem to be the epitome of cultural construction, in the sense that different cultures typically seem to have very different ideas on supernatural entities and processes. The religion of another culture is the domain in which we are most likely to find bizarre constructions, which strike the outsider as particularly weird. Only cultural transmission could explain that, or so it seems. I will try to show, on the contrary, that some nontrivial features are under-determined by cultural transmission and strongly constrained by prior cognitive structures.

It would certainly require an enormous mass of data to establish this definitively. What I will do is use available evidence to show that the prior structures account is (1) compatible with the available data on the representations in question and their acquisition, (2) strongly favored by evidence from cognitive development, and (3) not riddled with the theoretical and empirical problems generated by the empiricist account. And thus, it constitutes a psychologically plausible choice, which at least should be seriously considered and discussed.

2
The Varieties of Religious Representations

The previous chapter outlined a conception of cultural acquisition and cognitive constraints which may apply to cultural representations in general. I must now try to specify the particular properties of religious representations. This chapter will focus on two aspects of religious representations: their cognitive diversity and their connection to nonreligious representations. In both domains, we will see that standard anthropological theories do not really provide satisfactory answers. This discussion will not be merely critical, however; by examining the limitations of some pervasive anthropological assumptions, we can formulate more clearly the specific questions a cognitive theory should solve and draft the "brief' for a satisfactory approach to religious representations.

Research Programs and Definitions

At this point, it may seem necessary to give a manageable working definition of the very term "religious," in order at least roughly to delineate the domain of inquiry. There are many definitions of the term in cultural anthropology and as many controversies about the pertinence of these definitions. Moreover, there is widespread uncertainty about the very possibility of such a general characterization of "the religious." The

standard monographs of classical anthropology dissected a cultural environment in clear-cut categories: "kinship," "religion," "politics," "the economy," and so on. Modem anthropology is, by and large, rather skeptical about the pertinence of such divisions. Consequently, many anthropologists have stopped arguing about possible definitions of "the religious," on the assumption that the very distinction between religious and other representations is illegitimate. This idea takes many forms in modern anthropological theories, some of which are not entirely serious; others, however, raise important questions about the type of property that "religious" is supposed to denote and must be considered in some detail. Anthropologists and other social scientists are generally wary of general definitions of "religion" or "the religious," for at least three kinds of reasons: the terms of the definition may be ethnocentric; the precise formulation of a definition may wrongly take a superficial resemblance as the index of underlying commonalities; or such a formulation may obscure certain aspects of the phenomena. In this chapter I will briefly discuss these three problems, using this as an introduction to the tentative characterization that will be used in this book.

Worries About Cross-Cultural Validity

The doubt about whether it is possible to define "religious" representations at all is often based on the argument that the distinction is grounded in a set of criteria (the "sacred" vs. the "profane," or the "supernatural" vs. the "natural") that may well be particular to Western intellectual traditions and therefore irrelevant in other cultural contexts. After all, in many cultural environments there does not seem to be a term to designate religious representations or behavior as a whole, not to mention the idea of *a* religion (contrasted with *other* religions) that is certainly not universal. Using culturally particular categories in the study of human societies in general would amount to committing the sin of ethnocentrism, which in anthropology is not considered a trifling matter at all.

The idea, however, is extremely ambiguous. A first, simple-minded interpretation would be that people who have no category of "the religious," no distinction between religious representations or actions and the rest, literally have no religious representations or actions, by virtue of the fact that their "culture" has not "constructed" these categories. This, however, cannot really be a serious argument. In all natural lan-

guages it is possible to distinguish syntactic and semantic aspects; producing an ungrammatical sentence and producing a meaningless one are two different kinds of mistake. Native speakers, however, seldom have any notion of that

distinction, and in fact do not have more than an intuitive grasp of what the rules of their language are. This does not make the distinction less valid. So it is difficult to argue from the absence of an explicit category of "the religious," to the absence of religious representations, unless we assume that "cultures" have the power of creating all the reality of human affairs, which would be truly magical.

A second, less extravagant interpretation is a version of an argument I mentioned at the beginning of chapter 1. It is based on the idea that the resemblance between representations found in different cultural environments is deceptive. The representations cannot be the same, since they occur in different "contexts." Again, this could be taken in a radical way, to mean that no cultural comparison is ever possible because "cultures" constitute mutually impenetrable and incommensurable worlds. Or, more soberly, it could mean that representations are individuated by the kind of contexts, traditions, worldviews, "forms of life," and so on in which they occur, so that a similar idea, in terms of raw content, as it were, is not really the same if it carries different implications. As I said in chapter 1, "talking with the dead" does not seem to be the same thing at all in groups that do not attribute the same powers to the deceased, for example, in African and European environments. The only problem with this reasoning is that it is dangerously close to a self-contradiction. What makes us think that the two contexts, forms of life, and so on are different is that they comprise ideas about the dead and the living, and the action of the former on the latter, the contents of which are strikingly different. But if these ideas are different, by virtue of their different contents, it seems that we can after all evaluate similarities and differences of content, between ideas from different cultures... which is precisely what was denied at the beginning.1

Definitions and Causal Structure

A more serious version of the argument would accept that there can be a similarity of content between representations found in

1. This, obviously, is a very old argument, against an equally old mistake. Self-refutation is a constant characteristic of relativistic arguments. See Gellner 1979 (chaps. 2, 3, 7) and 1985 (chaps. 3 and 7); Lukes 1982; Newton-Smith 1982.

different "cultures"; the recurrence is real. However, the fact that they have different presuppositions and different implications could make it difficult to go beyond the mere observation of the recurrence, notably to ascribe the occurrence of that same representation to the same causes. For instance, the fact that many human groups seem to have some notion of "supernatural" entities and processes, even if it is the same idea, may be embedded in networks of presuppositions and implications which are very different. There may be different causes for the same set of representations; this, obviously, would be rather damaging for a theory that aims at uncovering the causes of the recurrence, for instance, in terms of cognitive constraints.

This argument, contrary to some of the ideas mentioned above, raises a real problem. It is always legitimate, indeed necessary, to wonder whether a property, taken as central in some empirical investigation, really corresponds to a stable causal structure. This is because there are indefinitely many properties that do not. For instance, the set of all white objects has no trait in common other than whiteness (which is not even a physical property); consequently, the very project of a "theory of white objects" is absurd. Compare that with the set of all things made of copper; in this case, many causal hypotheses apply to all objects of the set, by virtue of their being made of copper, and would have to be modified were the objects made of iron or water or silicon. As the starting point of an empirical research, "made of copper" seems a better candidate than such properties as "white" (or "black" or "taller than Socrates"). As J. A. Fodor puts it, "what you need in order to do science is a taxonomic apparatus that *distinguishes* between things insofar as they have *different* causal properties, and that *groups* things together insofar as they have the *same* causal properties" (Fodor 1987, 34). Does the term "religious" (in "religious ideas" or "religious practices") denote objects that have distinctive causal properties?

Giving a precise empirical answer to this question would probably take a whole book; as a matter of fact, it does take up most of this book. Whether "religious" is a valid analytical category can be settled only by judging what explanatory hypotheses can be produced on the basis of that category. Unfortunately, such questions are never discussed in anthropological debates, which invariably question the a priori validity of, for example, the distinction between religious and nonreligious representations or actions. Analytical categories, however, can never be evaluated a priori. They cannot be evaluated by examining the meaning of the terms; one must consider whether they support relevant causal

generalizations. In the chapters that follow, my aim is to provide fragmentary, but empirically founded, answers to the question.

Definitions and Research Programs

Worries about general definitions of religion often stem from a misunderstanding of what purpose a definition should serve and from an exaggerated belief in the power of definitions over theories. The very term "definition" is misleading here. The characterizations of religion that can be found in the anthropological literature do not constitute definitions in the strict sense of that word. That is to say, they do not give lists of sufficient and necessary conditions, on the basis of which one could sort out what is religious from what is not; no one in fact ever needs such membership criteria. When they set out to work on "religious" representations, anthropologists proceed in an ostensive way, like a biologist who embarks on a description of zebras or giraffes and takes as a starting point our commonsense understanding of what zebras and giraffes are. In the course of the investigation, it may become necessary to revise such characterizations. Their validity is an empirical question that can be settled only on the basis of data and causal explanations, not of a priori principles. In the same way, "religious representations" may or may not turn out to be a proper class of cultural representations. The only way to find out is to examine how far we can go in the explanation of their properties on the basis of our ordinary distinction. Anthropologists sometimes assume that definitions constrain theories. This apprehension, however, is largely unfounded. The success or failure of explanations leads naturally to the revision of initial definitions.2

If ostensive characterizations are largely sufficient, why do anthropologists argue about the proper definition of religion? The reason is that anthropological "definitions" in fact constitute the outcome, rather than the starting point, of particular research programs. They highlight the relevant aspects of religious representations, given a set of prior assumptions, notably about the ontology of cultural objects, their transmission, the particular methods that can be applied to them, and so on. Authors

2.. To take a standard example, a systematic investigation of the properties of a well-defined but nonexistent substance, phlogiston, led to many paradoxes; these were solved only by assuming the existence of another substance, oxygen. The only difference between a phlogiston-based and an oxygen-based chemistry of combustion is that the former does not allow explanation of combustion and oxidation on the basis of a stable set of causal principles.

who define religion as "a system of ideas with which the individuals represent to themselves the society of which they are members" (Durkheim 1964 [1915], 225) or even, more soberly, as a "symbolic system" are describing the particular aspects of religious phenomena their frameworks address. Such "definitions" cannot be fight or wrong; the sets of hypotheses they are based on, however, may be of different heuristic value, as either seminal research programs or dead ends. My own characterization of religious representations, which will be explained presently, should be taken in the same way as the result of a set of assumptions and models described in the course of the book. It does not constitute a definition, only a summarized description of a particular viewpoint.

Intuitive Unnaturalness

Anthropology does not have a very precise view of the acquisition and representation of religious representations because the question of subjective *naturalness* is often formulated in vague or implausible terms. Let me start with a simple example, taken from my own ethnographic work in Cameroon. Most Fang people think that witches are persons with an additional organ, which leaves their bodies at night and has all sorts of bizarre skills. The *evur* can fly on banana leaves, can make another person's blood turn black and thick, can kill fetuses in the womb, and so on.

A pervasive anthropological view is that the claims that seem to us rather odd are in fact perfectly normal, given a certain background of beliefs, theories, worldviews, and so on. Take the idea that some people have an additional organ, which

sometimes leaves their bodies, travels about, seems to have thoughts and intentions, and is set on killing as many people as possible. It seems strange to the observers, not just because they are not familiar with Fang "tradition," but more importantly because it seems to violate ordinary intuitive expectations. Members of the same species are usually assumed to have the same organs; flying on banana leaves is known to be rather difficult; and so on. The anthropological claim, to put it in the simplest form, would be that this impression of strangeness, based on principles rather than specific contents, is simply not felt by the people concerned. They have notions, beliefs, worldviews, and so forth that make the internal organ flying on a banana leaf every bit as "normal" or "natural" as the fact that objects tend to fall downward when one drops them. I will not dwell here on the various reasons, some of which are not entirely absurd, for which some anthropologists take this stance. The problem is that it flies in the face of the facts. The people

concerned find stories of flying organs and mysterious witchcraft killings fascinating as well as terrifying, precisely because they violate their expectations on biological and physical phenomena. They are certainly taken as accounts of real events, a fact that poses many problems of psychological description, as I will explain below. But they are not taken as accounts of ordinary real events. Their "attention-demanding" quality depends on the counterintuitive claims they comprise.

This simple fact is often misunderstood in anthropology because we tend to confuse *intuitive expectations*, on the one hand, and *explicit principles* or theories, on the other. Religious representations typically comprise claims or statements that violate people's ideas of what commonly takes place in their environment. For instance, some entities are described as invisible, yet located in space, intangible yet capable of mechanical action on physical objects; things fly in the air instead of falling to the ground, aging and death do not affect certain beings, and so on. Representing such events or states as special, non-ordinary, counterintuitive, and consequently attention demanding does not require an explicit, accessible "conception of nature." It requires only intuitive expectations about the behavior of physical objects in space, the biological processes that lead to death and decay, and so on. As I will show in chapter 4, such principled expectations are in fact extremely rich and complex; they impose strong constraints on the representation of events and categories. Against the background of these principles, of which only a small subset is accessible to the subject's consciousness, certain events and representations stand out as intuitively *unnatural*, to use a handy term.

Intuitive principles should not be confused with whatever explicit representations people entertain about what "nature" is or what is "natural" or, more generally, what account can be given of observed regularities in the environment. In many societies, there is simply no such explicit conception. In some places, however, either isolated individual reasonings or whole traditions are elaborated, the point of which is to reflect on the regularities of the environment. Such elaborations display great cross-cultural variations. As G. E. R. Lloyd points out, nothing could seem more straightforward, but nothing is in fact more distant to modern Western science than the Greek notion of *physis* (Lloyd 1991, 417-434).3 Two damaging fallacies, which are pervasive in anthropological theory, must be avoided at this point. The first one, as I said

3. Indeed, there is no reason why an investigation of regularities in the environment should be founded on a unitary concept of "nature," as Lloyd shows in a comparison of Greek and Chinese conceptions (Lloyd 1991, 419).

above, consists in confusing intuitive principles and accessible conceptions, whereas "there is all the difference in the world between an implicit assumption and the *explicit* concept" (ibid., 419). A second fallacy consists in taking for granted that explicit conceptions, elaborated in particular historical contexts, can actually govern people's intuitive expectations. This "top-down" influence, however, is far from obvious and should be accepted only on the basis of some positive evidence. As it happens, the experimental, notably developmental evidence tends to illustrate the importance of the opposite, "bottom-up" influence. That is to say, people's expectations about events are only weakly constrained by explicit theories; however, their explicit theories generally constitute attempts to extract general principles from the range of situations or events they would intuitively find "natural."

To sum up, saying that there is a set of representations about supernatural events or agencies only commits us to the

hypothesis that people have some cognitive means, of which they are not necessarily aware, of sorting out events and states that violate intuitive expectations from events and states that do not. The resulting division may or may not display cultural variability. This is an interesting question, the answer to which is not predetermined by our "definitions" and should be settled by empirical investigation.

Thematic and Modality Aspects

Obviously, this way of describing the characteristic aspects of religious representations is far from original. It differs from other anthropological models, however, by the insistence on intuitive properties rather than "cultural models" and by our concern here with strictly cognitive aspects of the question. In the following pages, I will examine to what extent common anthropological notions can help us gain some understanding of(1) the cognitive structures underlying the intuition of unnaturalness, and (2) the connections between representations of the unnatural and other types of cultural representations. In order to do this, I will consider two distinct, perhaps complementary approaches to the description of religious objects. These may be called the Tylorian and Durkheimian stances. Tylor assumed that belief in "souls," or some other form of "spiritual beings," was the hallmark of the religious. Durkheim, on the other hand, conceived of religion as consisting of beliefs related to "the sacred." Religious representations and actions are shrouded in mystery and awe, and the difference between such "sacred"

contexts and everyday ideas or situations is mainly seen as a difference in psychological overtone. Religious beliefs are identified in a Tylorian perspective by their particular *objects*, namely supernatural entities. In Durkheimian theories, religious beliefs are set apart by virtue of a particular *modality*; they exert a special fascination.4 Whether religious representations have special objects and whether they are processed in a special mode are two fundamental questions for a cognitive theory. This is why I will take these rival approaches as a starting point in the examination of religious representations.

The Thematic Stance: False Problems and Real Diversity

Let me start with the Tylorian approach, with the notion that cultural beliefs and actions can be labeled "religious" if their objects are spiritual beings. This notion is the gist of our commonsense notion of "the religious," and is taken as a starting point by authors as diverse as R. Horton (1960), J. R. Goody (1961), M. Spiro (1966), and E. T. Lawson and R. McCauley (1990). This list is far from exhaustive, and indicates only the diversity of approaches that are compatible with the thematic stance, the idea that religious representations concern a special class of objects.

As I said above, anthropologists are generally very alert about the possible "ethnocentric" character of the category RELIGIOUS. They tend to think that important differences may be concealed by putting ideas from different cultures into this one category, RELIGIOUS. At the same time, however, anthropological models generally ignore other differences that may be far more important for a proper study of religious representations. In the description of the religious notions of a single culture, we are often reminded that "religious" is not necessarily a proper category, and that, for the people concerned, religious representations may be instrinsically connected to other domains (kinship, politics, etc.) that our common categories would tend to set apart. Yet there is no mention of the possibility that, even in the single domain of

4. Ironically, this amounts to an intrinsically psychological description of the difference between the religious and the ordinary. Although Durkheim's work is pervaded with the refusal of "psychologistic" explanations, understood as explanations from individual psychology, the foundation stone is itself of an essentially psychological nature.

religious representations, in a single mind, there may exist important differences in terms of *functional properties*. That is to say, the way certain types of religious representations are acquired, memorized, represented, inferred, and so on may differ from the way other types of religious representations are processed. On the contrary, anthropological theories generally suggest that all religious representations are acquired and represented in the same way. This is because it is in

fact assumed that all cultural representations are acquired and represented in the same way. This assumption is not only factually wrong; it is also the main obstacle to a proper theory of religious representations.

At this point I must admit that my description of common anthropological assumptions is more a reconstruction than an observation. It would be rather difficult to find, in anthropological theories, an explicit defense of the claim that all cultural representations are acquired and represented in the same way. This, however, does not mean that my criticism is not valid. There is no explicit defense of the claim, simply because differences in acquisition and representation are not considered at all in anthropological models. An intellectualist model, for instance, assumes that religious ideas are theoretical entities, the point of which is to provide good explanations for natural and social occurrences. There is no study of the functional differences that may exist between various aspects of such "theories." A similar point could be made for authors who view religious representations as "symbol systems," "meaning systems," "metaphors," "codes," and so on. The only explanation for this remarkable omission, barring anecdotal factors, is that such differences are not considered important, which constitutes precisely the claim for functional unity I am criticizing.

Functional Diversity: Some Commonsense Remarks

There are many arguments against the assumption of functional unity. Before turning to scientific ones, let me point out that the claim is implausible, even from the standpoint of a commonsense description of religious representations. Let us take a simple example. Imagine we are trying to describe the set of mental representations that make someone a competent member of the Catholic church. Obviously, formulated in this vague way, the task is a rather formidable one, and the idea of "competence" it is based on may be problematic. We can ignore these difficulties for the time being, since we are dealing only with a first

approximation, a description that would make sense to other (non-Catholic) members of the same group, and provide a reasonable description of what makes a Catholic a Catholic. Also, we will ignore the fact that our investigation may become absurd if we do not have a good description of how Catholicism originated, how it developed, and so on. Here we are only trying to give a tentative list of the representations we expect to find in our subjects, such that they would not be Catholics if these representations were absent.

The subjects of our thought experiment have at least a vague notion of some theoretical assumptions, for example, about the creation of the world, the immortality of the soul, or Christ's resurrection. They also have more specific representations, such as the capacity to distinguish a holy mass from a meal. They do not think that they ingest consecrated wafers for alimentary purposes. They also know that the priest does not play the same role in the ritual as the congregation. They know that this difference does not depend only on the person of the priest; were he some other priest, the ritual would still be a mass. I am not alluding here to any complicated notions they could have, consciously or not, about the theoretical difference between ritual and everyday life, or between ritual specialists and their congregation. I am only describing very concrete notions that are presumably shared by most participants. One could of course carry on describing such representations for a long time, especially if we have the unreasonable goal of providing a full description of what constitutes Catholicism. This very rudimentary description, however, is sufficient to make the point about functional diversity.

Even without much sophistication in cognitive matters, one must notice that the representations and capacities described above are probably not all acquired and represented in the same way. The idea that there is only one god, who created the world, and so on, was probably transmitted explicitly. It may be also represented explicitly, as a set of propositions. The notion that mass is not a meal may well have been transmitted explicitly, but the features that make it possible to tell one from the other were certainly not. Furthermore, they are generally not represented as accessible propositions. Subjects have strong intuitions about what kind of situations they are in, but they may have some difficulty spelling out the criteria on which such intuitions are founded.

Not to put too fine a point on it, even a commonsense description would lead to the idea that there must be some cognitive diversity in the set of religious representations which make our subjects Catholics. Being competent in a theory, and being able to tell one situation from another,

are very different things. Remembering propositions is not the same as remembering episodes; knowing who a certain person is, is functionally different from having general notions about what made that person what he or she is. Here we are coming back to a point that was already mentioned in chapter 1. Cultural transmission *is* a complex affair. From this complexity, however, anthropology seems to have drawn the wrong conclusion: namely, that cultural transmission need not be described in a precise way, that it is a jumble where socialized subjects eventually find what they need in order to become competent members of the group.

Here I will defend the exactly opposite conclusion. Because cultural transmission is complex, the acquisition and representation processes may well be different for different types of representations. If we want to describe transmission at all, we therefore need some precise description of these diverse modes of acquisition and representation. I will argue that a proper study of religious concepts must take into account the fact that religious representations belong to different types. To these different types correspond different functional properties.

Cognitive Diversity and Repertoires of Ideas

One of the factors that hamper a proper description of cognitive diversity is what may be called the *theologistic bias* in cultural anthropology. This consists in the assumption that the religious representations of a given group, "culture," or "society" constitute an integrated and consistent set of abstract principles. To say that they are integrated implies that the representations found in various discourse registers or contexts are in fact connected and constitute an overall system. To say that they are consistent implies that the system in question contains no unintended contradiction.5 The "theologistic" bias leads to anthropological descriptions, in which religious beliefs are presented as consisting of shared, context-free general statements, such as "the spirits dwell in the rivers," "the ancestors are invisible," and so on. Such descriptions are misleading for at least five main reasons:

1. Many religious representations do not consist of general principles, but of memories of singular episodes.

5. Needless to say, this does not exclude in any way the *intended* inconsistencies that abound in many religious systems, such as the idea that three persons are in fact one person but remain three distinct persons, and so on.

2. Even as concerns general principles, anthropological descriptions tend to gloss over the distinction between what is stated and what is simply *presupposed* by what is stated.

3. Obviously, religious representations are in many respects context bound. A contextless description of people's beliefs about their ancestors, for example, may appear inconsistent, simply because different aspects of those entities are relevant in different contexts.

4. Yet the overall consistency of people's representations about religious matters should not be taken for granted. In such matters, people are often faced with situations of uncertainty, in which two equally plausible, yet incompatible interpretations are put forward. For instance, the ancestor cult with its rituals and the corresponding system of ritual positions may well be largely independent from the ideas about witchcraft and magical capacities; although these "systems" are likely to converge, if only because they coexist in people's minds, it would be absurd to take them a priori as an integrated worldview.6

5. Last but not least, individual variations and skepticism concerning the basic tenets of a religion are often taken as some kind of unimportant "noise" in religious representations. On the contrary, they can provide precious indications as concerns the processes of acquisition and belief fixation.

Beyond these empirical problems, there is a more important theoretical principle at issue here. What turns the heuristic principles into a theoretical fallacy is that integration, sharedness, consistency, and so on, inasmuch as they are indeed observed, are taken for granted instead of being construed as the phenomena to explain. The actual existence of a shared, integrated, consistent set of religious representations is an *explanandum*. It is often taken as self-evident for several reasons: first, because the transmission of religious representations is taken as a simple process of cultural absorption; second, because the kind of psychological hypotheses implied by anthropological models often consist in *ad hoc*

constructions. If we leave aside the hypothesis of "theological" integration, we must consider the different types of representations involved.

6. As E. Gellner puts it (1988, 58), "the non-referential element or principle contained within each such conceptual sensitivity... is not identical with the non-referential element in other similar sub-systems .... They may all support each other and form a moral system, and, indeed, this is indeed how societies seem to work: but the various sub-systems are not identical, and do not, so to speak, use a single referential currency. Each mints its own."

It is only on the basis of such a precise description that the interconnections between religious notions can be properly examined.

Four Repertoires

Here I will distinguish four main types of representations involved in religious representations. Obviously, these could be categorized in many different ways, and I do not mean to suggest that this way of dissecting religious systems is necessary or exhaustive. The main rationale for this division will be given in part 2, in which each of these types will be examined in turn. This classification, like all such classifications, is valid only for certain analytical purposes. Since the main aim of this study is to deal with cognitive constraints that affect the acquisition and representation of certain representations, I will focus on types that are likely to have rather different functional properties, as far as cognitive processes of acquisition and representation are concerned.

Religious representations can be described as belonging to four main "repertoires," namely the *ontological*, the *causal*, the *episodes*, and the *social categories* repertoires respectively. I will try to show that describing and explaining people's religious representations consists in describing what is included, in a given culture, in each of these repertoires, and explaining how their contents are gradually made plausible. Before turning to this point, let me give a succinct description of the typical contents of each repertoire.

The *ontological* repertoire is the set of representations people entertain about the very existence of nonobservable entities. This catalogue will include representations about there being, for example, a distant impersonal creator somewhere in the skies, water spirits near ponds and rivers, invisible ancestors lurking in the darkness of the forest. This catalogue of representations is called ontological because it consists of elementary assumptions about what sorts of things there are in the world.

The *causal* repertoire is a catalogue of representations and assumptions about causal links between the entities described in the ontological repertoire, on the one hand, and observable events and states of affairs, on the other. Thus a causal repertoire may include assumptions like "gods get angry if no sacrifice is performed" or "reciting a formula will guarantee good crops." The repertoire may include not only generalizations of this kind but also propositions about singular events or states of affairs, like "so and so got disease X because he did not observe prohibition Y," or "we had no crops last year because of X's witchcraft."

The *episode* repertoire consists of descriptions of a certain range of situations that are connected to the ideas contained in the ontological and causal repertoire. Describing a religion implies describing a set of particular actions or states that are deemed to be of particular types. In my description of the episode repertoires I will focus particularly on ritual performance, which is obviously the most crucial type of episode concerned. Again, it is important to note that the representations involved may be about singular objects, such as memories of ritual X being performed last week, or about generalized types, like the list of things to do in order to perform a given rite in the proper way.

The *social categories* repertoire is a catalogue of representations about differences between people. In this catalogue we will include not only people's representations concerning their priests, shamans, or other religious specialists but also representations about other differences that are relevant in religious action. For instance, it will include people's ideas

about gender where relevant, about growth and maturation where an adult/child opposition is concerned, about the effects of initiation, and so on. All these representations are used to characterize, and sometimes categorize, social actors, either *in abstracto* or as concerns known persons.

An Ethnographic Illustration

In order to make these explanations more intuitively clear, let me take an example of their concrete application to the religious representations of the Fang of Cameroon (see Boyer 1986, 1988 for more detail). In the following sections I will use this example to illustrate some of the general claims I want to make about religious representations. Although the specific contents of the "repertoires" are, obviously, particular to the Fang, it must be stressed that the general conclusions I will put forward are in fact based on much broader ethnographic comparisons, which cannot be included in this chapter.

Ontological Ideas. The repertoire of ontological representations is organized around four main points: two remote personified gods, as well as the ghosts (*bekong*) and the spirits (*minkugu*). In Fang mythology, there are two creator-gods. Mebeghe is the creator of all natural things, while Nzame initiated most cultural techniques and social institutions. It must be stressed that the narratives of the origins are not the object of much attention or speculation. Nzame and Mebeghe are

rather remote gods. Their powers are not really invoked or used in the explanation of natural or social occurrences, although there are individual variations in this domain. The role of Nzame is sometimes conceived as that of an impersonal, purposeless fate. It must be pointed out, however, that such a notion of contingency is alien to the Fang intellectual climate, as to that of most African societies. If salient events are to be explained at all, they have to be explained in terms of goals and intentions; this is made possible by the concepts of ghosts and spirits.

The term *bekong* could best be translated as "ghosts" or "ancestors." They are often represented as wandering shadows. The spirits of the dead are generally malevolent until they are given appropriate funeral rites. The *bekong* are then said to dwell in ghost villages and protect the villagers. Correct performance of traditional rites is indispensable, lest the ghosts "throw" illnesses of various kinds at the living. Ghosts have beliefs, desires, feelings, emotions, and generally all the nonphysical characteristics of humans. In Fang discourse, however, they are generally treated as a kind ("the ghosts do this," "the ghosts want that," etc.) rather than as individuals.

The mystical cast also includes rather mysterious creatures called *minkugu*. These are not clearly identified as ghosts. They are described as smaller, not related to village clans and lineages in a defined way, and rather uncanny. They too can "throw" illnesses, and some specialists say their remedies are given by the *minkugu* rather than the ghosts. Although most people insist that there is a difference in kind between *bekong* and *minkugu*, their ideas about their respective powers, appearance, and so on are extremely vague.

Causal Connections. The repertoire of causal connections includes many general connections between the entities described above and various classes of events, which however are generally less salient than representations of singular episodes. It is, for instance, generally admitted that the ghosts can trigger various kinds of misfortune if they are not satisfied that the living perform traditional rites appropriately. People who hold such ideas, however, generally focus on memories of singular occurrences, in which a certain disease was diagnosed as "thrown" by the ghosts. In the same way, the fact that illness is commonly caused by witchcraft is stated in very vague and general terms. People, however, have precise memories of many singular cases, with the problem, the diagnosis, and the outcome. The same remark applies to magical charms and recipes. While their general efficacy is stated only in

the vaguest terms, people have numerous accounts of the successes or failures of precisely identified recipes.

Typified Episodes. These representations concern situations, notably ritual ones, related to the entities of the ontological repertoire. The repertoire includes names for complex scripted actions. To take but one example, *nku melan* is an

initiation ritual during which neophytes are shown the skulls of their ancestors, usually concealed in special shrines. The main characteristic of such actions is that they are represented as rigidly scripted. They consist in a list of sub-actions which, from the actors' viewpoint, must be performed in the appropriate way and in the appropriate order by the appropriate specialists.7

Social Categories. There are of course many categories designating types of people. Here I will mention only the subset that is directly pertinent to religious representations. Some of these categories are supposedly descriptive, identifying some persons by virtue of the rituals they have learned to perform. Thus, a diviner is called *mod ngam*, "divination man," or a storyteller who specializes in epics is a *mbommvet*, "harp player." A crucial category is that of *ngengang*, "healer." Most rituals connected with questions of magical connections and relationships with the ghosts require the intervention of a *ngengang*. Such activity-based categories, however, presuppose another classification, this one in terms of unobservable qualities. It is impossible in this society to be ascribed any religious role without being considered a *beyem* that is, a person who carries the invisible organ called *evur* (see above). Every living person either is or is not a *beyerm*. There is, however, no way of telling for sure whether any given person is or is not one. The category *mimmie* ("simple folk") designates people who have no *evur*. Another important category is that of *ntuban nlot* ("pierced head") people, that is, people who have undergone specific initiation rites. Again, since these initiation rites are shrouded in secrecy, it is uncertain whether any given individual is or is not a member of that category.

Artificial Divisions and Causal Relevance

Compared with ordinary ethnographic presentations of religious representations, this description may appear rather artificial,

7. Although actual performance may display great variations, the participants are generally unaware of those changes or consider them insignificant.

because of the division in different catalogues or repertoires of representations, each of which seems only very loosely organized. It may seem artificial, for instance, to set apart ideas about persons from ideas about situations, since all social episodes comprise actors, and actors are always observed in a specific situation. The division between these different "boxes" may seem all the more contrived, as many religious assumptions connect representations from different repertoires; for instance, Fang people say that "only a *ngengang* can cure a witchcraft-induced disease."

The objection, however, does not really hold. The division I am putting forward is a functional one. It does not mean that the representations in question are not connected; it means only that their acquisition and representation may imply rather different functional processes. It is a constant feature of cognitive explanations that they differentiate between aspects of the stimuli which are usually found in combination. To take a simple comparison, it may seem artificial to set depth perception apart from color perception, since normal subjects, in normal conditions, seldom see objects in space without perceiving their color and texture, and vice versa. The division is indeed "artificial," in the sense that it is not available to the subject, but it is also legitimate, for depth and color are two aspects of visual stimuli which are in fact processed, to a large extent, independently. More generally, it is a common situation in any empirical investigation that one must attribute different causal backgrounds to aspects that are always found in combination "on the ground." In order to describe the processes underlying the cultural acquisition of a set of religious representations, we need a fine-grained description of the functional differences between the types of representations included in that set. In part 2 of this book, we will see how this description accounts for recurrent features of religious representations.

The Modality Aspect: Epistemic and Cognitive Viewpoints

Let me now turn to the second stance, which characterizes religious representations and actions as corresponding to a special modality of belief. Durkheim's original distinction between "sacred" and "profane" situations and ideas just does not pass the test of cross-cultural comparisons. Many actions and contexts that appear undoubtedly "re-

ligious," in our ordinary understanding of the term, are not performed in the atmosphere of mystery and awe suggested by Durkheim's description. However, the validity of the theoretical principle does not depend on the adequacy of its specific formulation in Durkheim's works. Although most anthropologists now doubt that religious situations correspond to a specific emotional overtone, especially that described by Durkheim, it is often assumed that religious representations can be characterized and opposed to nonreligious ones in terms of modality of belief. Beliefs are contrasted in such terms as "everyday" versus "religious," "rational" versus "symbolic," "scientific" versus "traditional," and so on. In its earliest versions, the opposition was between intellectual styles supposed to be representative of "the West" and the rest. Anthropologists, however, showed conclusively that beliefs of a very rational and practical nature could be found in exotic cultures, and that typically "primitive" notions were in fact widespread in modem environments. Mystical behavior is no more predominant in technologically simple groups than science is in modern ones. The opposition was thus displaced; instead of contrasting types of "cultures" or societies, it focused on two types of situations or contexts, both of which can be found in all human groups. There are many versions of this idea in cultural anthropology. I will not attempt to review them here, no more than I described the numerous characterizations of the supernatural in the above discussion. My aim is to examine some general problems that are generated by the very notion of a "modality of belief." This discussion makes it possible to formulate more precisely a series of problems a cognitive theory should address.

The Question Of "Symbolism"

The distinctions mentioned above ("everyday" or "rational" versus "religious" or "symbolic") are usually expressed in very abstract terms in anthropological theories. They are construed as corresponding to "styles of reasoning," "modes of thought," or "intellectual orientations." Before turning to these abstract concepts, it may be of help to consider the kind of evidence the oppositions are based on. I will not review in any detail the ethnographic data. More simply, I will try to list a few common properties of religious contexts, which constitute the intuitive basis of these distinctions. All the points listed below are very common in religious contexts, and most anthropologists will recognize familiar situations. For the time being, I will suspend the

question of whether such intuitive descriptions correspond to any cognitive reality.

1. Counterintuitive claims. As I pointed out above, religious representations comprise a number of claims concerning nonnatural events or states, in the sense that they violate intuitive expectations. Religious notions would not be interesting, would not be attention demanding, if they complied with intuitions about ordinary events and states. So it seems plausible that the representations in question are treated in a special way, which differs from the way representations of ordinary processes are treated.

2. Complex concepts. The meaning of certain crucial concepts seems particularly difficult to elucidate and seems rather obscure to the actors themselves. Take for instance the Fang notion of *evur*, described above. This entity is supposed to account for certain people's magical powers. The *evur* is often described as an organ by religious specialists. In the past, the Fang performed postmortems on the bodies of suspected witches and sometimes found *evur*-like polyps in the stomach. In mythical stories, by contrast, *evur* is described as an animal. In the actual use of the notion, however, both descriptions seem inadequate. Although people are sometimes positive that certain events or states can be attributed to someone's *evur*, they have no available description of what it is. In such cases the term designates either the fact that someone has certain powers or the unknown substance or property that makes her or him powerful. Most religious systems comprise concepts of this kind, which seem particularly difficult to gloss in precise terms.8 These problems must not be confused with more common difficulties of translation, which may result from the fact that a category refers to some historically specific reality (e.g., BASEBALL), designates something that does not exist (e.g., UNICORN), or something that is difficult to represent (e.g., THE EMPTY SET).

3. Inferential gaps. This is a very common phenomenon in the actual use people make of publicly stated religious principles. Although people often seem to hold true the statements in question, they seem uncertain about the validity of propositions that could be directly derived from those statements. This often leads to what a "the-

8. For a more detailed description of what makes such terms special, see Boyer 1986; Boyer 1990, chap. 2.

ologistic" description would take to be inconsistencies. A familiar example is that of the Zande, who have certain ideas about the way witchcraft capacities are transmitted, yet perform postmortems even in cases that should be excluded by those transmission rules (Evans-Prit-chard 1937). As many authors have pointed out, this is not entirely inconsistent. In this as in many other cases, however, people are not committed to propositions that, from a logical viewpoint, should inherit the certainty of the principles from which they were derived.

This list is by no means exhaustive. Certainly many features combine to create the intuition that religious contexts display particular intellectual properties that cannot be found in other contexts. As ! said above, this list of features is not meant as a theoretical statement. It may well be the case that some of these features are the result of wrong descriptions. Despite these caveats, however, the list may help us understand why cultural anthropology puts forward modality-based distinctions and exactly what is wrong with that approach.

The Epistemic Approach

The main point of the notion of "modality of belief," and of most anthropological notions about religious "beliefs," is to provide a description of a special *way of thinking*. This is usually described in terms of a contrast with another, supposedly more basic way of thinking, for example, "everyday" or "commonsense" thinking. People's understanding of most ordinary physical or biological events does not usually result in strikingly counterintuitive claims, does not require inscrutable concepts, and does not usually lead to the inferential gaps described above. Hence the assumption that these domains can be differentiated in terms of not only the contents of the thoughts but also of *functional* characteristics. Ideas about religious events, in this approach, are not seen as processed in the same way as ideas about everyday occurrences. Religious representations are then described as corresponding to a specific "mode of thought" and constituting a special kind of "beliefs." Such distinctions, however intuitively plausible, often generate difficult theoretical problems.

First, such oppositions are often particularly unclear about the exact extension of the classes of thoughts which are being contrasted. For instance, the opposition between "everyday" and "religious" thoughts is not really symmetrical. Whereas the domain of religious representations can be more or less delineated (with the difficulties mentioned

above), the residual category of the "everyday" is far from clear. Things are even more muddled when the "religious" is opposed to the "rational"; a class of contents is contrasted with a type of structure. This presupposes a congruence between two oppositions, which in fact may well be orthogonal. There are many rational or everyday elements in religious things and irrational or religious elements in everyday occurrences. Moreover, the descriptions of a religious or symbolic mode of thought invariably ignore the cognitive diversity of religious representations, which I stressed in the above section. They treat representations of abstract propositions, memories of episodes, knowledge about singular persons, and so on as being cognitively similar. More precisely, they always view them as reducible to a system of integrated abstract propositions. This theologistic bias is particularly unfortunate in models that purport to describe *functional* modalities, and their differences, in the treatment of thoughts.

This leads to a major objection that has important consequences for a cognitive framework. In the description of modes of thought and modalities of belief, we find a mistake that is in fact general to anthropological descriptions of religious representations. The mistake consists in describing such ideas from an *epistemic* rather than a *cognitive* viewpoint. Describing a set of ideas from an epistemic viewpoint consists in viewing them as an attempt to say something about the world, as constituting some form of knowledge (however vague, inconsistent, or actually false) of the world. For instance, the Fang representations described above in some detail can be said to constitute a certain view of the supernatural world, which aims to account for otherwise inexplicable occurrences. In contrast, describing a set of representations from a cognitive viewpoint consists in showing what processes lead people to entertain the thoughts they actually entertain. The question of whether they constitute a system, represent the world, explain it, and so on is irrelevant in a cognitive study. Religious representations are almost invariably described in epistemic terms in anthropology. They are explained as abstract intellectual systems, not as mental representations actually entertained by human subjects.

The distinction may seem rather unimportant, insofar as we are concerned with the content of a set of representations. It

becomes crucial when we are trying to put forward an explanation for their occurrence. The confusion between those two viewpoints leads to a confusion between *epistemic reasons* and *cognitive causes* for the occurrence of particular representations. Causes and reasons are identical only for ideal

knowledge systems, which human minds are not. Human minds have many cognitive characteristics that make them suboptimal. That is to say, many representations are not actually entertained, which from an epistemic viewpoint would optimize knowledge; conversely, there are many aspects of cognitive processes which hamper an epistemically optimal representation. This point is both very simple and crucial to a realistic description of cultural representations.

A cognitive description of religious representations should focus on the mental representations involved, rather than on their abstract descriptions in terms of "theories," "conceptions," "worldviews," and so on. Such intellectual constructions do *not* constitute cognitive phenomena; they constitute only their analytical description, from an epistem-ically optimal viewpoint. Otherwise, whatever explanations we put forward are likely to be about imaginary objects rather than real processes. To take a simple illustration, consider C. R. Hallpike's description of "primitive thought" (1979), an attempt to explain various puzzling facts about magic and other aspects of religious symbolism. In Hallpike's view, these apparently irrational claims result from the fact that the cognitive processes of the people concerned are similar to those of "pre-formal" children, in Piaget's classification of the stages of cognitive development. In a technologically primitive culture, the "cognitive development of its members will be correspondingly retarded and stabilized at a level below that of formal thought" (Hallpike 1979, 101). There is no space here to discuss Hallpike's claims. Let me just point out that most of the cultural material in his essay consists of what anthropologists call "collective representations," that is, abstract descriptions conducted from an epistemic viewpoint. They do not describe thoughts that occur to actual people; they describe thoughts that people might entertain, in the anthropologist's view, if they wanted to make sense of what they actually do and say. Hallpike treats such constructs as direct, literal descriptions of people's mental representations, which of course leads to rather extravagant interpretations. Ritual statements, which people take as counterintuitive and which demand attention precisely because of their counterintuitive quality, are thus described as though they formed the basis of people's ordinary apprehension of natural and social phenomena.9

9. See P. Harris and P. Heelas 1979, L. Holy and M. Stuchlik 1983, 55-80, and Sperber 1985b, chap. 1 for a general discussion of the difference between "collective representations" and real mental representations, and G. Jahoda 1982 for a thorough discussion and critique of Hallpike's notion of primitive thought. Furthermore, Hallpike

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The epistemic approach is the main reason why discussions of modes of thought almost inevitably lead to *normative* rather than *descriptive* models. This is illustrated by the ways in which the notion of a "mode of thought" or "style of reasoning" was used in the "rationality debate." The main goal of this theoretical debate was to reconcile people's obvious rationality in everyday life with their apparently irrational claims, notably in the domain of magic (see Jarvie and Agassi 1967; Wilson 1970; Hollis and Lukes I982 for general surveys). The starting point in all rationality debates is that a set of beliefs, for example, belief in magical causation, seems to violate some principles of rationality. Rationality is characterized as the proper way of deriving inferences from observations, or of matching intentions with beliefs. But people seem to think the way one should not think, if one wanted to achieve a true or valid description of the world. In general discussions of this question, there are of course very different ways of solving this problem of apparent irrationality. A classical way was to accept that the people concerned are indeed irrational. This of course was theoretically (if not morally) elegant, but it posed more problems than it solved, as the people concerned did not appear to be irrational in most situations. Another approach is that people are indeed rational all along. The beliefs are irrational only from an outsider's viewpoint, especially if the outsider ignores the set of background notions in which the beliefs are grounded. Or, again, one may posit that people are, in those specific contexts, slightly irrational, in a way that is not really damaging, because it purchases social cohesion at the price of cognitive consistency. The rationality debates are of course much more refined, and sometimes philosophically sophisticated, but the point remains that they are normative. I

am not claiming here that the standard of rationality is not a valid one; I claim only that such discussions, by virtue of being normative evaluations, have little to do with a description of what actually happens in terms of cognitive processing.

"Symbolism" and Knowledge

Let me now return to the various intuitive features mentioned above: counterintuitive claims, inscrutable concepts, inferential

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compares collective representations to a Piagetian model of cognitive development, against which there is now considerable empirical evidence, as we will see in chaps. 4 and 5.

gaps. A proper description of religious representations should establish whether they correspond to real cognitive characteristics and should account for them. The failure or irrelevance of most epistemic reflections on this question at least allows us to formulate the "brief" for a cognitive study in more precise terms. First, in the absence of any definitive evidence, there is no reason to think that those characteristics are particular to religious representations and cannot be found in other cognitive domains. Even intuitively, it seems likely that counterintuitive claims, inscrutable concepts, and inferential gaps can be found in many nonreligious domains. It is certainly necessary to understand why religious representations seem to have such features. This, however, does not imply that the features are the consequence of a specific way of thinking. Second, the description must be about real cognitive processes rather than the abstracted description of their possible epistemic consequences. In this section, I will examine two models that make sense of the features mentioned above.

Symbolism and Metaphor

Certain formal aspects of religious representations make them rather similar to metaphors. If we return to the various intuitive features mentioned above, we can see that each of them corresponds to a typical trait either of metaphorical utterances themselves or of the processes whereby they are understood.

The fact that religious representations are often attention demanding because of their counterintuitive character corresponds to a widespread interpretation of metaphor. Against the Aristotelian notion that a metaphor is based on a simile, a number of authors have suggested that it is precisely the dissimilarity or *tension* between the associated terms which motivates the metaphor; calling a devious person a "snake" makes sense precisely because listeners or readers know that people cannot literally be members of that species.10 A classical example in anthropological discussions of translation and rationality is the Nuer statement, reported by Evans-Pritchard (1940), that "twins are birds," which seems a perfect example of a metaphorical statement based on the tension between incompatible meanings.

10. The tension view was put forward by I. A. Richards (1936). See Black 1962 for an "interactionist" perspective, the purpose of which is to combine similarity and tension. For a general survey of philosophical, linguistic, and psychological aspects of metaphor, see Ortony 1979; E. R. MacCormac 1985; D. E. Cooper 1986.

In the same way, the conceptual ambiguity of many religious notions could be described as the result of quasi-metaphorical understandings. As I pointed out in my explanation of Fang concepts, although people have very precise characterizations of the effects of *evur*, they do not seem to have such definite ideas about what *evur* itself is. Whenever the entity itself is mentioned, it seems to be phrased almost exclusively in metaphorical terms. This may explain why there is a diversity of incompatible characterizations; they consist in partly convergent metaphorical images, rather than alternative literal descriptions. Again, the fact that something can be the object of a plurality of (literally incompatible) metaphors is a familiar feature of figurative speech.

As for what I called "inferential gaps," they seem to be a necessary aspect of metaphors, and of analogical

understandings in general. Because metaphors are partly based on a semantic tension, they may be described as suspending some of the inferences that would be produced by a literal reading. Comparing people to snakes produces certain inferences, mainly about their moral qualifies. Other possible inferences, however, are generally suspended, for example, that snakes have no legs, lay eggs, and so on. The fact that only some of the possible inferences are taken as relevant is the main characteristic of metaphor, and that is also what makes its interpretation a puzzle for psychology (see for instance Black 1979, 21ff.).

From these obvious similarities, some anthropologists have concluded that what is generally known as "religious symbolism" in fact consists of a set of metaphorical understandings. A number of ethnographic descriptions start from the assumption that the notion of metaphor, as well as some technical terms used in linguistic description of metaphor, constitute the natural idiom in which religious representations should be described (see, e.g., Sapir and Crocker I977, Fernandez 1986). This comparison not only focuses on the functional similarities mentioned above but also encompasses the motivation and the effects of religious action and discourse. As J. W. Fernandez points out, metaphors are essentially strategic rhetorical devices. They conceal as much as they suggest; metaphors of religious discourse can be analyzed as the result of definite "strategies" on the part of the speakers (Fernandez 1986, 8ff.). Furthermore, the emotional tenor of religious interaction can be seen as the outcome of metaphorical meanings. Drawing from his detailed analysis of metaphor in ritual, notably in the Fang *bwiti* religion (1982), Fernandez points out that "by persuasion and performance [the metaphors] operate upon the member, allowing him eventually to exit

from the ritual incorporated, empowered, activated, euphoric" (Fernandez 1986, 23).

Beyond such suggestive ethnographic description, however, the notion of metaphor does not seem to lead to a satisfactory description of cognitive processes. This is because the anthropological models that make use of the notion are not based on a precise cognitive description of how metaphors are produced and understood. What is used instead are pretheoretical intuitions about the nature of metaphorical constructions. As a result, such models compare a phenomenon (religious representations) that is not really understood to one (metaphor) that is not understood at all. This is in fact the most important criticism that can be made against the use of the term "metaphor," namely that in such a context it is itself metaphorical. The term usually designates a set of figures of speech and the utterances that convey those figures. It is an intrinsically linguistic phenomenon. When we say that the notion of the twins as birds is "metaphorical," we are not literally saying that the Nuer are realizing a figure of speech. What we mean is that the thoughts involved are structured in a way that is somehow similar to the way concepts are used in actual metaphors. But this comparison, being metaphorical, has all the superficial brilliance and the hidden vagueness of metaphors. It seems to be saying something profound about the thoughts in question, but it would be difficult to say exactly what. Metaphors are both persuasive and question-begging. These characteristics, which constitute all the cognitive "power" of metaphors, also constitute the main theoretical hazard involved in using the notion of metaphor in a metaphorical way. By saying that religious symbolism is a metaphorical constructionthat the notion of a cosmic order in a certain tribe, for instance, is but a metaphor of village orderwe suggest a lot but demonstrate very little. Saying that a certain religious discourse is based on this or that "metaphor" dispenses the anthropologist from a detailed description of the intellectual processes involved. But these are not self-evident; on the contrary, they are what a cognitive study of symbolism should describe.

Symbolism and Evocation

Sperber's general work on symbolism (1975, 1980) constitutes a far more precise psychological description and explanation of the features mentioned above. It may be of help to describe the model in some detail, as it highlights some important problems we will have to

deal with in the next chapters. The critical part of the argument focuses on the accounts by Victor Turner and Claude Iévi-Strauss of meaning in ritual and myth. Turner treats cultural symbolic activities as the expression of hidden "meanings," and for Levi-Strauss cultural symbols are elements of a "code" mentally represented in binary opposition structures. Sperber argues that both theories are plainly insufficient. Against such notions, Sperber contends that the

particular features of religious representations, and of cultural "symbolism" in general, stem from a particular way of treating mental representations. The model is based on a contrast between "rational" and "symbolic" modes, which can be represented as two abstract information-processing devices. The former mode is applied automatically to most perceptual or conceptual inputs on which attention is focused. It provides conceptual interpretations for those inputs by activating relevant assumptions in memory. Typically, the rational device provides interpretations for an indefinitely large (and indefinitely variable) set of inputs, on the basis of a limited set of memories and conceptual structures. Some inputs, however, cannot be given a full description by the rational device. This triggers symbolic interpretation. The "symbolic" device is understood as the set of processes that search memories and knowledge in order to produce certain hypothetical assumptions. These are selected as pertinent only if their being true would make it possible for the rational device to interpret the input. Contrary to rational processing, symbolic interpretation thus tends to activate indefinitely many assumptions, in order to process even a limited set of inputs.

The model is extremely general; it does not apply only to religious or even cultural representations but applies more generally to contexts in which a subject is required to put forward conjectural assumptions, in order to interpret a puzzling situation. It makes it possible, however, to describe and explain in an economical way some important properties of religious representations. To return to the example given above, the Fang notions concerning the organ or capacity called *evur* can be used to illustrate the mechanisms at hand. Fang people are told that some persons have an invisible additional *organ*. On its own, this assertion would probably conflict with many intuitive assumptions. It is also suggested that this organ is endowed with perception, thought, and intentions. Even more counterintuitively, this sentient being is sometimes said to leave the body and fly about like a bird, killing other people in mysterious ways. Each of these additional assertions makes a "rational" understanding of *evur* more difficult, in the sense that there are no

assumptions in memory, which would make the combination possible, between the notion of an organ and that of intentionality, or between that of a sentient being and that of a bird. There are, however, many principles and episodes in memory which are partly relevant to these assertions. For instance, there are many memorized situations for which the properties of *evur* could provide a partial explanation.

An important feature of such processes is that they do not necessarily reach a satisfactory interpretation. In many cases, the symbolic "device" may produce indefinitely many assumptions that are relevant to the initial input, without ever leading to a result that could be processed rationally. Indeed, this is what happens in the case of many religious "symbols." The assertions concerning *evur* do not produce any straightforward rational interpretation of what the entity is or can do. It is of course likely that people who have experienced the same situations will activate partially overlapping sets of assumptions in the interpretation of a given input. This limited convergence, however, cannot be interpreted as the "meaning" of the assertions unless one has a particularly uncon-strained notion of meaning.

This model provides a simple description of the properties of "symbolism" listed above. Counterintuitive assumptions are likely to be treated symbolically, since they by definition go beyond what could be intuitively expected. In the same way, symbolic evocation will typically focus on partly interpreted categories, and it will often produce more mysteries than it solves. Finally, it is not surprising to find inferential gaps in symbolically treated assumptions, as symbolic evocation is driven by relevance, not by logical entailment; any assumption could in principle be activated to enrich any input, provided some partial (nondeductive) link could be established between them. The model also makes it possible to understand why the analogy between religious representations and metaphors is both suggestive and irrelevant. There are indeed similarities between the two domains; this is because they are both the outcome of symbolic processes. Figurative utterances, like counterintuitive religious claims, are not amenable to a direct rational interpretation. They trigger a heuristic search for relevant conjectures.

Memory Search and Conceptual Structure

This model constitutes a useful starting point for a cognitive description of religious representations. It puts forward a plausible

account of the general properties of symbolically treated representations, and a framework in which those questions can become the object of empirical investigation. Rather than a theory of memory and inference, Sperber's suggestive hypotheses constitute a sort of meta-theory or a "brief" for a detailed model. The general principles must be enriched in order to put forward precise hypotheses about processes whereby cultural representations could be acquired and represented. One aspect in particular must be mentioned, as it will be crucial in the study of religious representations. Sperber's model centers on the processes whereby subjects make inferences on the basis of an input and a mass of representations stored in memory. As a result, the mechanisms of memory search are crucial to the model. To understand the types of inferences subjects produce from certain inputs, we must know how particular assumptions are retrieved and activated. Sperber's general framework does not specify such mechanisms, beyond the idea that symbolic processing is *not* constrained by the nature of the input or by established "codes." This is partly because the thrust of the argument is mainly critical, trying to dispel unnecessary assumptions from the study of symbolism, notably the notion of cultural symbols as bearers of "meanings." Thus memory searches are mainly described as a quasi-random process. They are, for instance, compared to the way a reader may find additional information in an open-stack library, by browsing through the shelves rather than just consulting the catalogues. This very general description, however, cannot be a sufficient model for the study of any specific domain of inferences. The notion of quasi-random search leads to familiar paradoxes, in artificial intelligence and cognitive modeling in general. Given a certain input, there are indefinitely many representations available in memory, such that their contribution could complement the input and make it rationally tractable. The search for possible conjectural interpretations could therefore require an indefinitely large number of processing steps, but this seldom happens. Confronted with figurative utterances for instance, listeners can in most cases activate a number of plausible interpretations almost instantaneously. There must be some mechanisms, then, that constrain memory search and reduce the problem space. There seem to be two alternatives at this stage. On the one hand, the memory search mechanism may be described as having some prior information as to what would constitute a relevant assumption to activate. However, it is difficult not to assume that such a search mechanism already "knows" what it is looking for, as it were, so that the search is indeed limited but also entirely redundant. Alter-

natively, one could assume that the knowledge base, in which the memory search takes place, does not consist only in sets of juxtaposed assumptions. It includes conceptual structures, which constrain memory searches to take certain paths rather than others. This is, again, a very familiar point in cognitive modeling; unless one wants to accept indefinitely long searches, one must assume that knowledge structures provide some information to constrain inferential processes.

Conclusion

The strangeness or counterintuitive quality of religious representations is approached in anthropology from two perspectives. Some anthropologists tend to think that the oddity of religious claims stems from cultural distance. Once replaced in the "context" of local norms and ideas, these religious claims are perfectly natural. This, as I said above, is not entirely satisfactory. Religious claims take their attention-demanding quality, which is crucial for acquisition and transmission, precisely from the fact that they are not entirely compatible with ordinary intuitive expectations. The other, converse, perspective, which often characterizes models based on metaphors and special modalities of thought, is that religious representations constitute a form of speculation that is entirely unconstrained by ordinary cognitive capacities. This conception of religion as fantasy makes it in principle impossible to examine the relation between ordinary knowledge and religious representations. A proper study of religious representations should therefore make it possible to go beyond these approaches by examining in precise terms the constraints imposed by ordinary knowledge structures on counterintuitive religious representations.

Hypotheses about the production and selection of inferences are bound to remain vague and speculative if we cannot understand how conceptual structures constrain inferences. This very familiar point will be crucial in the rest of this book. I will describe religious "symbolism" as strongly constrained by the properties of the conceptual structures that are activated by religious inputs. Two important remarks must be made at this point. First, religious inputs (representations, statements, actions, etc.) are likely to activate conceptual structures that are not religious in content. Indeed, I will try to show to what extent religious representations and inferences are in fact strongly constrained by non-

religious intuitive knowledge structures. Second, the way inferences are constrained by those structures may differ according to the conceptual domain activated. This is where the question of the different conceptual "repertoires" becomes particularly relevant. Religious representations are about types of entities in the world, causal connections, categories of persons, and types of episodes. It may well be the case that conceptual structures in these four domains are organized in sensibly different ways and therefore constrain inferences from religious input in equally different ways. Indeed, there is strong psychological evidence that this is the case. In the following chapters, I will try to give a precise answer to the various problems raised here. In chapter 3, I will examine the question of conceptual structure and examine the various properties of concepts which are likely to be relevant to the study of religious representations. The principles and hypotheses formulated in chapter 3 will then be applied to the four repertoires described above: representations about causal connections, ontological hypotheses, types of social episodes, and social categories. This will constitute the main theme of part 2, that is, chapters 4 to 7.

3
Two Aspects of Conceptual Structures

In order to explain the recurrence of certain ideas, and to examine to what extent this recurrence can be explained (notably) by cognitive constraints, one must have a relatively precise idea of the acquisition, representation, and usage of the concepts concerned. Equally obviously, we cannot put forward a precise account of religious concepts without some notion of concepts in general. Religious concepts are concepts, and therefore have all the properties of the class of which they are a subset. Most of this chapter will focus on problems that may seem remote from the anthropological study of religious representations. It is, however, necessary to examine conceptual structure in some detail, as this has crucial consequences for anthropological hypotheses. Obviously, the point here is not to put forward a general account of conceptual representation nor even to provide a comprehensive survey of a particularly complex field. The aim is to formulate a few principles that will be particularly relevant to our specific problem.

Concepts, Similarity, and Quasi-Theories

Let me begin by making two simple, yet important distinctions. First, accounts of concepts and conceptual structures should not be confused with accounts of *word-meanings*. Although concepts

provide the cognitive basis of language use, there is not a perfect congruence between concepts and words in natural languages. There are many examples of concepts which are certainly represented even though there is no word to label them, and conversely there are many cases in which a variety of words can be used without a corresponding variety of concepts. Second, concepts as examined here should not be confused with meaning or *sense* in the Fregean understanding of the term. We are interested here in the narrow psychological aspects of conceptual content, which leaves aside questions of reference. However simple and classical, these distinctions are important, if only because religious notions constitute domains where nonreferential usage is predominant, for obvious reasons, and where the connection between concepts and word meanings is particularly complex, for reasons we will examine below.

In the following pages I will survey a number of general issues concerning conceptual representation.1 I will start with what seems an obvious property of concepts, namely that they are based on some representation of the similarity between objects. I will then try to show why similarity-based accounts of conceptual structure are insufficient. This is a point that is now classical in psychological theories of conceptual representation, yet is generally ignored in anthropological descriptions. Finally I will try to go further than this presentation of the "state of the art" and suggest a minimal characterization of conceptual structure.

Concepts and Similarity: Classical and Prototype Models

Intuitively, what makes a concept is the recognition of a certain similarity. It may seem self-evident that concepts are means of putting together singular objects (exemplars) that share some property or properties. Similarity can be of a perceptual or conceptual nature. The concept CAR brings together objects that share certain observable features, while the concept FRIENDSHIP denotes behaviors and mental states that share less directly manifest properties. It therefore seems natural to infer that a conceptual representation consists of some representation of the similarity in question. In this conception, a subject has a certain

1. This cursory survey will not examine all the psychological aspects of this question. It provides an abbreviated history of theories in conceptual representation, from which many important questions and controversies (as well as particular references) have been omitted (see Smith and Medin 1981; Neisser 1987 for a general overview and specific references).

mental concept if he or she has a representation of what makes the instances of the class similar. Most theories of concept representation are based on some version of the similarity hypothesis.

The approach that is generally called "classical" or "Fregean" in the psychological literature holds that a conceptual representation consists of the representation of a series of features that are singly necessary and jointly sufficient to characterize the similarity between instances of the concept. For instance, the concept TELEPHONE may be defined as a device that converts sound waves into modulated electrical current (through a microphone) and vice versa (through a speaker) and can be connected to other similar devices. A device that has all these features is a telephone, a device that lacks any one of them is not. Again, the features may be of very different types. For instance, the definition of NOSEGAY Or JACKET may involve perceptual features as well as functional ones. Whatever these differences, the presence of singly necessary and jointly sufficient features is assumed to define (and exhaust) the mental representation of concepts.

The main arguments against the "classical" approach came from the work of E. Rosch and her colleagues on prototypical effects in categorization (see Rosch 1977; Rosch and Lloyd 1978). The main conclusion of those experimental studies was that membership in a category is not always a yes or no question, as the classical approach would predict. In a number of experimental categorization tasks, subjects seem to differentiate between certain instances judged to be particularly good examples of the concept, and others that are less representative. For instance, a robin seems a "good" instance of the concept BIRD, but an ostrich seems intuitively less representative. There are many experimental ways of showing that this intuitive distinction corresponds to a real difference in categorization. Some instances seem to be full exemplars of a class, while others seem to be members of the category only "up to a point." This, however, goes against the very principle of the classical approach. If a series of necessary-sufficient features defines a category, then every object either is or is not a member of the category. Rosch's solution to this problem was to replace the classical view with an alternative "prototypical" conception, which is based on two premises.2 First, membership in a category is not a yes or no question; it is a matter of graded judgment, between 0 (nonmembership) and 1 (full membership). Sec-

2. In this presentation of the "prototype view" I leave aside another fundamental aspect of Rosch's theory, concerning the existence of a "basic" level in hierarchies of nested categories.

ond, the degree to which any single instance belongs to a concept depends on its similarity to a mentally represented "prototype." Robins for instance are presumably more similar to the prototypical bird than ostriches, which explains why the degree of membership in the category BIRD is higher for the first kind of bird.

Although there is little disagreement about the existence of "prototypicality" effects such as those reported by Rosch, there are a number of problems with the "prototypical view" as a general description of conceptual representation. One such problem is that the theory lumps together two different questions, that of the cohesiveness of categories (what holds them together) and that of the identification procedures (whereby instances are identified as members of a category

[Osherson and Smith 1981]). In many cases the prototypicality effects may reveal some aspects of the identification procedures; that is, what mental processes make it possible to ascribe a given instance to a category, rather than aspects of the conceptual representation itself. For instance, although subjects are slower at classifying ostriches than robins as BIRD, they nevertheless consider ostriches as real birds, not semi-birds. Also, some typicality effects depend on contextual factors, so that an instance is judged more or less typical of a category, depending on the context (Ruth and Shoben 1983). Finally, prototypical effects can be generated even for concepts that are unambiguously defined in terms of necessary-sufficient conditions. Subjects who define ODD NUMBER as any number that is not a multiple of 2, nevertheless tend to judge certain numbers as more "typical" than others of the category of odd numbers. In such cases, the coexistence of a classical definition and some prototypes seems to show that these approaches are in fact focused on different aspects of conceptual structures, rather than constituting alternative accounts of those structures.

Even with this distinction in mind, the notion of prototype-based identification generates many difficulties. To take but one problem, which will be particularly important to our discussion, the approach ignores important differences between conceptual domains. The notions of graded membership and prototypes are assumed to be relevant, in much the same way, for all types of concepts. This, however, is not really plausible. Consider the simple distinction between artifacts and living kinds. The conceptual representation of artifacts certainly includes defining features, related in a complex way to prototypical features. On the one hand, most objects that fulfill certain functional purposes may be considered to be instances of TELEPHONE, even if their appearance or

functioning makes them untypical ones. On the other hand, the very idea of "defining" a living kind concept like LEMON or TIGER makes little sense. Living kind terms, and in fact most natural kind terms, are not amenable to "definitions" conceived as lists of necessary-sufficient features. Whatever features are supposed to be characteristic of lemons (color, shape, taste, texture, etc.), one can imagine instances that have those features, yet are not considered members of the class (like a longish yellow orange with an acid taste). Conversely, one can imagine instances that are considered members of the class yet do not exhibit the typical features (like an orangeish, round-shaped lemon). In most similarity-based accounts of conceptual structure, there is little consideration of the obvious differences between the domains of nominal kinds (amenable to definitions) and natural kinds. This difference is bound to have some important effects on the way features and prototypical images are related. More generally, the fact that conceptual structures can be very different, depending on the domain considered, is not taken into account. I will return to this important theme presently, after an examination of the deeper problems posed by the notion of similarity-based concepts.

Similarity As Theory-Driven

Both the classical and the prototypical approaches are based on some notion of similarity, though the notion is construed in very different ways. In both cases, it is assumed that having a concept is having some representation of what makes instances of the concept similar. There are, however, many reasons to think that similarity is insufficient; more specifically, in many cases having a concept precisely means having something more than a measure of similarity for a set of objects. To begin with, it is possible to show that people's intuitions of similarity often conflict with their intuitions of category membership. If the similarity account were true, a new instance would be considered more likely to be a member of category A than of category B if it was more similar to other members of A than to other members of B. In many cases, however, two instances can be judged similar yet not members of the same category, while two instances are judged dissimilar yet members of the same category. L. Rips's experiments (1989) for instance provide a striking illustration of this phenomenon. In many circumstances, subjects presented with triads of items (*a, b, c*) can judge both (1) that *a* and *b* are more similar than *a* and *c* or *b* and *c* and (2) that *b* and *c* are members of the same category. For instance, subjects are given a set that includes

a U.S. twenty-five-cent piece, an average-size pizza, and an unknown circular object with a three-inch diameter. Subjects are generally uncertain about whether the third object can be judged more similar to the coin or the pizza, yet are quite certain that the object is not likely to be a twenty-five-cent piece. So intuitions of category membership are only partly directed by intuitions of similarity. In this case, the fact that certain objects (such as coins) have a fixed size is a

consideration that overrides judgments of similarity.

More generally, as many authors have pointed out, the similarity approach is insufficient in the sample sense that any judgment of similarity presupposes certain choices, as to what aspects of the objects considered are taken to be relevant to category membership (McCloskey and Gluckberg 1979; Armstrong, Gleitman, and Gleitman 1983; Murphy and Medin 1985; Medin and Wattenmaker 1987). Any two objects can be judged similar or dissimilar from indefinitely many different points of view. Concepts cannot be based on a pure similarity metric because such a metric would take all dimensions of similarity as equivalent, which is precisely what people do not do when they categorize objects. They clearly weigh differently the attributes of instances. Size is crucial for COIN, relevant for LEMON, and almost irrelevant for PICTURE. It is difficult, however, to introduce such weighting in a similarity-based account without producing models that are much too vague to account for conceptual coherence (Medin and Wattenmaker I987, 33) or else break apart the very notion of similarity. If similarity is assumed to be an entirely different type of judgment for coins, lemons, and paintings, then the notion of "similarity" means only that concepts put together things that are supposed to have something in common, which is of course true but trivial.

It is therefore necessary to put forward an alternative account, in which conceptual representation is not based on mere judgments of similarity. Medin's notion of implicit "theories" (Murphy and Medin 1985; Medin and Wattenmaker 1987) is an example of such an alternative. The main assumption here is that the cohesiveness of a category, what holds it together, is constituted by a set of implicit theoretical assumptions. These not only establish the relative relevance of different attributes for categorization, they also provide explanations for the presence of the attributes: "people not only notice feature correlations, but they can deduce *reasons* for them based on their knowledge of the way the world works" (Medin and Wattenmaker 1987, 36). For instance, one cannot have the concept cots without having some theo-

retical assumptions about the production and use of coins that makes certain features (e.g., exact similarity of type and historical origin) more salient than others. As D. L. Medin and W. D. Wattenmaker put it (1987, 41), the cohesiveness of a category, in this account, "derives both from the internal structure of a conceptual domain and the position of the [category] in the complete knowledge base."

Conceptual Structure As Knowledge

Some notion of theoretical assumptions or implicit "microtheories" is at the foundation of most modern models of conceptual structure.3 Concepts in various domains are described as including in-terrelated *assumptions*; these not only describe the entities designated but also provide a structure that makes relevant certain types of similarities and makes possible certain expectations. The use of the term "theory" in this context may be misleading in that it suggests a type of structure which may be too constraining (notably in terms of explicitness, integration, consistency) to accommodate most concepts. One of the consequences of this approach is to suggest a new conception of the links between conceptual structure and knowledge.

In a similarity-based approach, and in fact in commonsense conceptions of categories, concepts are understood as building bricks out of which knowledge is constructed. Concepts are seen as elementary units that include some description of the entities they denote. Beyond these elementary descriptions, concepts are linked by theoretical propositions that connect them in more complex structures. Concepts are *internally* structured by resemblance, and *interconnected* by explanatory principles. The concept GIRAFFE for instance is supposed to include some elements that allow users of the term "giraffe" to recognize real giraffes and refer to them. Beyond this, propositions such as "giraffes must eat to survive," "giraffes were born of other giraffes," and so on are conceived as higher-order combinations of simple concepts (GIRAFFE and BIRTH, GIRAFFE and DIET, for instance). If the "theory-based" approach is pushed

3. I will leave aside theories that focus on instance-based or context-based aspects of categorization (Brooks 1978; Barsalou 1983, 1987; Brooks 1987) and imply that there are no such things as stable abstract conceptual representations. The question of whether concepts constitute stable structures or simply recurrent properties of the access to non-abstract information is irrelevant to the present argument concerning the insufficiency of similarity and the different types of assumptions activated by the use of a concept (see below, this chapter).

to its logical consequences, however, this is not really tenable. The information about giraffes contained in the above assertions is now seen, not as an association of the concept GIRAFFE with other ones, but as an integral part of that concept itself. The way subjects recognize certain similarities between observed giraffes and neglect observable differences (or indeed other similarities) seems to be driven by theoretical considerations. If two giraffelike animals react to a predator in very different ways, this does not seem to cast doubt upon their identification as giraffes. If, however, one of these animals is observed to lay eggs, even unsophisticated observers will assume that it cannot be of the same species as ordinary giraffes. So, again, having the concept means having some way of sorting out which similarities count as relevant and which do not. To sum up, in a classical picture theories and other forms of complex conceptual structures are seen as combinations of concepts. The "microtheory" approach suggests that theories are in fact an integral part of conceptual representation, that they are "inside" concepts, to use slightly metaphorical terms. In the following pages, I will try to examine some consequences of this approach. In chapter 2, we saw that an account of "symbolism," in any particular domain, requires a precise description of conceptual structures. In the rest of this chapter, I will describe the aspects of these structures which are likely to be particularly relevant to our problem.

Causal Schemata and Nonschematic Assumptions

The most important conclusion to draw from the "microtheory" approach is that concepts are, as F. C. Keil puts it (1989, 267-277), essentially *relational* entities. What makes it the case that someone has a concept is that he or she has acquired a set of relations that connect various assumptions about the objects denoted. I must stress that the term "assumption" does not carry any strong hypotheses about the representational format of those representations. They could be sentences of a mental idiom or scripts or analog mental models or pointers to imagelike representations. Nothing crucial to the present argument hinges on the specific representational format. The important point is that concepts are not conceived as containers, where definitions

or other identification procedures are stored, but as networks of assumptions. As a consequence, the properties of different conceptual structures can be conceived as properties of the connections between these assumptions.

Causal Schemata

The central assumptions that organize a concept are integrated, in the sense that each of them provides information without which the other assumptions would be irrelevant or not understood. To take a familiar example, it is plausible that the interpretation of the concept CAT includes a set of perceptual and nonperceptual features, for example, that cats can chase animals because they need them for food, that they need food because starved animals die, that they have hunting skills because they were born of cats with similar features, and so on.4 R. Boyd (1984, cited by Keil 1989, 42ff.) calls *causal homeostasis this* understanding of natural kinds, as entities characterized by a stable cluster of interconnected causal properties. I would claim, however, that the notion of a causal nexus applies beyond natural kinds, for example, to artifact categories. For instance, there are necessary links between the assumptions that characterize the concept ~. Cars have engines, transmissions, a metal chassis and body, and so on; each of these assumptions provides a context in which the others are intelligible. Most of these assumptions are linked by causal connections. Cars have engines, because engines make them move, and the function of cars is transportation. They are heavy, because they are made of metal, because metal is rigid, because they would fall apart if made of for instance, rubber. Such assumptions (the list is of course incomplete) constrain the concept, so that an imaginary vehicle that is made of plastic, hovers above the ground, and is sustained and propelled by magnetic fields would seem an example of a VEHICLE that probably does not belong to the category CAR.

Some aspects of conceptual structure, however, do not seem to fit with this "schematic" picture. That is to say, certain assumptions, which are part of the representation of concepts and constrain people's inferences or expectations about them, do not seem to be connected by strong causal links to the "schematic" part of the conceptual represen-

4. I am of course considering here a naive, nonscientific (and as a result partly inaccurate) understanding of what is particular to the species.

tation. Take, again, the example of CAR. Some assumptions about cars, which are not included in the schematic network described above, are however part of the understanding of the notion and direct our expectations and inferences about cars. For instance, cars are rather expensive things to buy (more than most everyday artifacts), luxury cars are more expensive to run than cheaper ones, and so on. In the same way, there are many peripheral assumptions governing people's expectations about cats, beyond the central ones mentioned above: that they are less "friendly" toward humans than dogs or that they play more when they are young, for example.

This division extends to more complex concepts. The cohesiveness of such concepts as MEMBER OF PARLIAMENT (in Britain) or CONGRESSMAN (in the United States) is provided by a series of causally related assumptions, to the effect that such people have to be elected, they serve for a limited period, they are supposed to represent the interests of a constituency, they draft and pass laws, and so on. At the same time, people's representations of such concepts include a host of assumptions which are not part of that schematic core, concerning for instance the fact that con-gressmen from this or that party are particularly likely to be corrupt, or to be liberal in issues of private morality, or to be indifferent to the interests of large businesses or poor people, and so on.

To sum up, we must distinguish between two parts of conceptual structure which constrain category membership and inferences in different ways. On the one hand, some assumptions are linked by strong causal links, which provide the basis of conceptual cohesiveness. On the other hand, other assumptions, which can be used to generate inferences, expectations, and complex sets of ideas, are not linked to that schematic core by causal connections.5 For want of better terms, we may call the former assumptions the *causal schema* of the concept and the additional representations *nonschematic* assumptions.

This distinction, in one form or another, is familiar in theories of conceptual structure. A particularly suggestive account can be found in S. Atran's description of the varieties of cultural representations attached to living kinds (1990, 215). Atran distinguishes between "schematized" and "non-schematized" representations. The notion is inspired by Kant's description, in the *Critique of Judgment*, of two possible ways in

5. Obviously, such assumptions and their links do not exhaust the features of conceptual structures. Concepts also include such features as (typically) a verbal label, semantic indicators (such as countability, for example), and so on. These features are irrelevant to the points made here.

which "intuitions" and "concepts" may be related. In Kant's own terms, intuitions subsumed to concepts are related to the concept, either "schematically" or "symbolically." In a schematic presentation, the relationship between the concept and the situation is "demonstrative"; in a symbolic presentation, it is "analogical" (Kant 1790,§ 59).6 The distinction I introduced above, between two types of assumptions, is partly congruent with Atran's Kantian framework. Two important differences, however, must be stressed. First, as I mentioned above, the set of assumptions that form the core of a conceptual structure seem in most cases linked by *causal* connections. Second, as I will try to suggest in the following section, the distinction is not of great explanatory power unless we have a precise description of the processes whereby additional assumptions are linked to a conceptual core.

Accounts Of Nonschematic Assumptions

The description of nonschematic assumptions may seem to be entirely negative or residual so far, so that we have no hypothesis about their structure. This problem is treated in various ways in psychological theories of conceptual structure. Keil for instance (1989,182) argues that conceptual representation includes not only networks of quasi-theoretical assumptions but also generalizations based on the non-theoretical apprehension of similarities. In this approach, assumptions about the relative costs of running a small Japanese car and a huge American limousine, for example, would be seen as mere inductive generalizations, which are added to the theoretical assumptions yet are not related to them. From a rather different perspective, R. Michalski (1989) argues that we should distinguish between "base concept representations" and "inferential concept interpretation." While base representations are context independent and are linked by deductive inferences, inferential assumptions are produced on the basis of contextual features of a situation,

using inductive inferences and analogical map-

6. Kant's own examples of quasi-schematic elements are dearly metaphorical: for instance, the organization of a nation-state can be construed as analogous to that of a living organism, or alternatively to that of a machine. Nonschematic representations, however, should not be construed as solely metaphorical; metaphor is only a salient example of quasi-schematic or nonschematic representations. One can use nonschematic assumptions in nonmetaphorical ways, but metaphors are invariably based on nonschematic assumptions.

pings. The way an object is matched to a concept depends on both types of representations.

Without dwelling too much on these complex questions, we must notice that neither Keil's nor Michaski's account is entirely satisfactory as concerns nonschematic assumptions. Keil's idea, that they are based on a sense of similarity, may be sufficient for the explanation of certain aspects of conceptual development (notably shifts from nonschematic collections of features to quasi-theories). It does not, however, provide an adequate account of the complex links that can be established between nonschematic assumptions. Far from being isolated inductive generalizations, they may be linked and form complex networks of assumptions. For instance, the idea that Japanese compacts are cheaper to run is linked to the idea that geographical origin is relevant for this class of objects, whereas it would not be for other artifacts. In other words, inductive generalizations can be combined in complex structures that are not themselves constrained by mere similarity.7 Moreover, a similarity-based interpretation of nonschematic assumptions inevitably generates the problems described above, in our discussion of similarity-based theories of concepts. Similarity is never sufficient, since subjects consider relevant only certain dimensions of similarity.

Michalski's account implies that the divide between deductive and inductive inferences, on the one hand, and that between noncontextual and contextual inferences, on the other, are congruent. Deductive inferences concern the "base concept representations" and are therefore noncontextual, whereas inductive inferences are necessary in order to identify exemplars on the basis of contextual features. This, however, is not necessarily the case, and the two oppositions may well be orthogonal rather than congruent. To return to our previous example, assumptions about the geographical origin of cars as a relevant feature for classification are not part of the schematic concept. They are based on some inductive generalizations about different types of cars. These generalizations, however, hold across very different contexts, and therefore they cannot be considered "contextual."

7. An additional argument against this idea is that, in domains that go beyond conceptual schemata, people typically do not compute statistical tabulations, or more precisely do not seem to treat them in a way that would be amenable to statistical formalization. Their inferences, on the contrary, typically ignore certain salient statistical aspects of the phenomena. This point is examined below in the section rifled "Return to Anthropology," which concerns the "non-normative" nature of nonschematic assumptions.

These models point to problems that will be crucial in the examination of religious conceptual structures. To provide a satisfactory account of any given concept, we must be able to give an answer to two series of questions. First, we must have a precise account of the mechanisms whereby nonschematic assumptions are added to the conceptual schemata, and of the processes whereby they are made intuitively plausible or natural. Second, we must evaluate the relative contributions of schematic and nonschematic assumptions in constraining inferences about a given domain of reality. In the models discussed so far, it is assumed that nonschematic representations constitute an unconstrained and unconstraining form of mental association. This, however, may be an artifact of the purely residual definition of nonschematic assumptions, rather than a theoretically or empirically motivated hypothesis. In the following sections, I will therefore turn to models that attempt to describe the construction and stabilization of such assumptions.

Cognitive Salience and General Inductive Strategies

It seems difficult to have an explanatory account of non-schematic assumptions without considering the complex domain

of inductive thinking: that is, of the varieties of nondemonstrative inferences whereby assumptions are generated, modified, rejected, or stabilized in relation to experience. This, obviously, is an extremely complex domain, and I will not attempt here to summarize all the problems that should be examined in a proper account of induction, understood in this broad sense (see Holland et al. 1986 for a general presentation). However, I must indicate some aspects of induction that should be particularly relevant to a study of religious conceptual structures. The aspects I will mention here concern mainly functional properties, that is, aspects of the role induction is likely to play in expectations, inferences, reasonings, or trains of thought.

Two aspects are particularly important here. First, nonschematic assumptions, contrary to schematic ones, can vary in their *credal status*. They command graded commitment, between possible conjectures and certain truths. This graded commitment is made obvious by differences in the extent to which evidence is required to modify their representa-

tion. While some assumptions are revised on the basis of a single situation, others are maintained even in the face of accumulating contrary evidence. Second, nonschematic assumptions can vary in *salience*, that is, in the probability that they will be activated, given a certain situation. Schematic assumptions, by contrast, are automatically activated whenever the conceptual structure is relevant to the situation at hand, whereas nonschematic assumptions are not invariably activated. Credal status and salience must be distinguished, because there are many situations in which an assumption can have a low credal status and a high salience. If someone tells me that "there are three sexes in worms," this strange notion is likely to be given a low credal status. If, a moment later, I hear a reputed biologist talking about "these many living species in which there are more than two sexes," I am very likely to activate the former assumption as a possible illustration of that claim (without necessarily increasing my commitment to it). In this situation, the assumption activated combines a low credal status and a high salience. Or consider again the familiar example of the concept CAT. The assumption that cats have certain biological needsfor example, that they will try to get food when they feel hungryis certainly *not* represented as a plausible generalization about cats. It is generally taken for granted, that is, automatically activated, whenever cats are observed in the environment. In most cases it is used in reasoning about cats' behavior without being explicitly represented. In the same way, the assumption that congress-men are people, not robots or animals, is certainly part of the schematic core of the concept. It is taken as a property of the class, so that the proposition that congressmen are human beings (in the literal sense of course) is not the object of any evaluation in terms of plausibility. Yet the individual's commitment to a given nonschematic assumption is a matter of graded judgment, which may be explicitly represented. Take for instance the common idea that dogs are "friendlier" than cats, or that right-wing congressmen will be more popular than left-wingers with fundamentalist Christians. Most people who represent those assumptions are aware of the fact that they represent plausible generalizations, which further data could make more or less plausible.

These properties of nonschematic assumptions are intuitively obvious, although the underlying cognitive mechanisms are particularly difficult to describe. Most cultural representations imply nonschematic assumptions, in the precise sense given here. They display both variable credal status and variable salience. Obviously, it is crucial for us to provide a precise answer to the question, What processes make a given assumption

stronger and/or more salient? What follows is a concise survey of some classical answers, as well as a reformulation of the question, which will be examined in more detail in the four chapters of part 2.

Subjective Probability

Much psychological literature, experimental and theoretical, focuses on "partial credal states," mental states in which an assertion is judged to be less than entirely certain (see general surveys in Cohen 1977 and Smithson 1989). Most of that research focused on subjective probability, that is, on situations in which subjects must evaluate the probability of a certain event. Some notion of degree of commitment has always been a necessary ingredient in theories of subjective probability (see for instance Ramsey 1931, Carnap 1950). In such theories, having a partial commitment to a proposition "p" means evaluating the probability of "p" being true, between 0 and 1. In the experimental studies, subjects are often

asked to describe probabilities in terms of ranked predicates (e.g., "certain, probable, possible, improbable, impossible") or in terms of numbers (typically in percentages).

The most important studies in this paradigm were conducted in the framework of "judgment under uncertainty" (Tversky and Kahnemann 1974; Kahnemann, Slovic, and Tversky 1982). The term "uncertainty" is used here to characterize judgments of likelihood "based on data of limited validity, which are processed according to heuristic rules" (Tversky and Kahnemann 1974, 1124 [1982, 3]). Most judgments in everyday life are computed on the basis of fragmentary data, only partially relevant to the question at hand, and therefore are of a probabilistic nature. The main outcome of the extensive series of experiments conducted on such judgments is a negative result concerning the lack of congruence between people's spontaneous judgments of probabilities and what would be predicted by normative theories, such as Bayesian calculations of subjective expected utility. People's inferences on the basis of uncertain data seem to show that their reasonings systematically ignore or violate certain basic principles of statistical inference. To take but one such violation, people sometimes judge that the likelihood of a conjunction of two events is higher than the likelihood of either of the two events happening on its own. Given a personality description of a certain person, they may judge, on the basis of social stereotypes, that it is more certain that the person in question is a "feminist bankteller" than a "bankteller" (ibid.). This, obviously, violates the basic Bayesian

principles for the probability of combined events. There are a number of other such violations (neglect of base rates in evaluations of probability, belief in inferences from small samples, etc.). These seem to indicate that intuitive judgments of plausibility are nonnormative in the sense that they violate basic Bayesian theorems. As A. Tversky and D. Kahnemann put it, subjects "rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations" (ibid.).

Although such studies uncover many interesting features of subjective judgments, they have important flaws that make them less than satisfactory. First, they are generally based on a particularly narrow understanding of statistical reasoning. As a result, the subjects' failure to reason within the terms of one particular framework (Bayesian theory) is interpreted as a failure at statistical inference in general.8 Second, these studies do not lead to any integrated, consistent set of hypotheses concerning partial credal states. For instance, Tversky and Kahnemann have put forward the notion of "heuristics and biases" to account for people's actual nonnormative reasonings. Such principles, however, amount to little more than *ad hoc* descriptions of the violations of statistical inference.9 As M. Smithson puts it (1989, 194), "none of these heuristics is well grounded in an account of human information processing."

Another, general flaw of such studies must be pointed out, as it has consequences for the study of nonschematic assumptions in general. Subjective probability studies do not include any general hypotheses that could be directly used in more natural, less constrained contexts than the experimental situations (for a general review, see Smithson 1989, 193-197). The main problem here is that the subjective probability situations are only a very small and very artificial subset of partial credal states. The fact that an evaluation of probabilities leads to partial commitment does not entail the converse, namely that all phenomena of variable commitment are necessarily estimations of subjective probability. The latter constitute a very special case of inductive thinking, for several reasons. First, in the experimental situations, subjects are led to represent *ex-*

8. On this point, see G. Gigerenzer et al. 1989, 228-234, which shows how the subjects' responses, in Tversky and Kahnemann's studies, are compatible with rational statistical inference, but of a non-Bayesian character.

9. For instance, people are described as working on the basis of a "representativeness" heuristic, which means that they tend to overemphasize the likelihood of events corresponding to their categorical stereotypes. In the same way, a "vividness" principle corresponds to the fact that people typically overestimate the statistical weight of events of which they have direct experience, and underestimate that of less directly accessible data.

plicitly the degree to which a certain assumption can be relied on. This, however, is a rather unnatural way of considering plausible assumptions. Observing that the car stalls and that there is almost no gasoline left in the tank may lead to the

belief that the two events are causally related. Although entertained as a plausible hypothesis, this is certainly not represented as "certain at 95 percent," for example. It is not even necessarily the case that a measurement of plausibility is represented at all, a point to which I will return below. Furthermore, the notion of a general "degree of certainty" entails that we can compare the plausibility of two assumptions referring to very different objects. This, however, is very counterintuitive, because differences in degrees of commitment seem pertinent only between closely related assumptions. For instance, it makes intuitive sense to say that someone believes "cats are clever" more strongly than "cats are attached to their owners"; it seems intuitively absurd to compare "cats are clever" and "congressmen are all corrupt" in terms of degrees of commitment. The idea of a unified measurement of partial acceptance across domains, either in terms of subjective probability or in any other terms, seems untenable.

The "Induction Theory" Paradigm

An examination of nonschematic assumptions in conceptual structures should make it possible (1) to give a more precise formulation of the intuitions concerning partial credal states, (2) to provide an account of the strengthening (and weakening) of assumptions, and (3) to describe the type of conceptual structures that are based on assumptions of variable salience. The theory should account for the fact, for instance, that differences in salience are only relevant between assumptions that concern the same broad categories of objects or states of affairs. It should also describe the processes whereby rival, incompatible assumptions are entertained and selected. However surprising it may seem, there are very few cognitive theories of such processes. Here I will make use of one such attempt, sketched by J. R. Anderson (1983) and developed as a general framework on inductive reasoning by J. H. Holland, K. J. Holyoak, R. E. Nisbett, and P. R. Thagard (1986, henceforth designated as "induction theory"), in which the intuitions concerning schematic and nonschematic assumptions can be reformulated in precise terms.

Induction theory describes a cognitive system engaged in inductive reasoning as receiving input from perceptual sources and memory stores,

generating "posted" descriptions of the current situation, and generating expectations about future events. Many features of the cognitive system described in induction theory are derived from Anderson's ACT* architecture (Anderson 1983). The representations available in memory are called *rules* and consist of what the artificial intelligence literature calls "production rules," that is, "if... then..." formulas (ibid., 41) that link conditions and actions, for example, "*If* the object has four legs *then* infer that it is a (cat, dog, zebra)" or "*If* the object has four legs *then* evaluate the object's color"10 Among the indefinitely many rules available, some are "activated," that is, currently involved in providing interpretations. The operations conducted on active rules result in "posting," that is, in activating the "*then*..." part of a rule as the representation of the current situation.

Given some current representations about the external world given by the perceptual system, there are indefinitely many rules that could possibly provide an interpretation of the current situation. A fundamental principle of induction theory is that rules *compete*, that they do not have the same "survival value" in the light of the available data.11 This survival value in processing operations is described as depending on four dimensions, called strength, support, match, and specificity. *Strength* is an initial measure of probability, which is the result of past usage of the rule in interpreting actual situations. For instance, one may assume that the following three rules are ordered here in decreasing strength: (1) "*If* the object looks like a horse *then* it is a horse," (2) "*If* the object looks like a horse *then* it is a stuffed horse," (3) "*If* the object looks like a horse *then* it is a unicorn that has lost its horn." *Match* is a measure of how well a certain rule describes the features of the situation at hand, notably the perceptual input in the system. If the object looks like a horse and has black and white stripes, rules that include both features in their "*if*..." part will have a better match value than rules that do not specify the stripes. *Support* refers to the internal coherence between the particular rule activated and other activated rules in the system. If the rules activated all include the black and white stripes in their "*if*..." part, then rules that assume no stripes will have a low support value. *Specificity* is the completeness of the description given by

10. It is important to remember that despite the terms "if" and "then," production rules are not deductive formulas. They associate a condition and a consequence, not a premise and a conclusion.

11. The description of competition in induction theory is directly inspired by Anderson's chapter on conflict resolution in ACT* (Anderson 1983, 132-137).

the rule activated. Given a zebra in the visual field, rules that identify it as an animal or a mammal in their "*then...*" part will have less specificity value than rules that identify it as "horselike" or "a zebra," although they may have the same match, strength, and support values. As Holland et al. put it, the competition will favor "those rules that (a) provide a description of the current situation (match), (b) have a history of past usefulness to the system (strength), (c) produce the greatest degree of completeness of description (specificity), and (d) have the greatest compatibility with other currently active information (support)" (Holland et al. 1986, 47ff.). In induction theory, the competition between rules is described in quasi-economic terms. Whenever a rule is activated, it carries a certain "bid" that is a function of its strength, specificity, match, and support. The fundamental principle is that, in a competition between rules, the highest bidder will win and be "posted" as representation oft he current situation.12

A "Backward-Strengthening" Process

Strengthening is a complex cognitive phenomenon. In a commonsense conception of inductive thinking, an assumption is all the more salient if it is repeatedly used to describe certain situations. Strengthening is therefore viewed as a result of habituation. People who hear thunderstorms being routinely described in terms of a god's anger end up having a salient assumption to the effect that storms are triggered by the gods' mental states. Like all such commonsense descriptions, this hypothesis contains a grain of truth and conceals a crucial ambiguity. The truth is that strengthening is related to the fact that assumptions have been "posted" as true descriptions of situations. The ambiguity is whether the assumption that is strengthened is the one that was posted. As we will see in the following pages, this point is

12. I take here "induction theory" as a starting point, because it constitutes the most complete account of inductive reasoning so far. Not surprisingly, it is not an entirely unproblematic account. For instance, it is not clear that the "problem-solving" paradigm is relevant to all spontaneous cognitive processes. Many trains of thought and associations cannot be described as evolving toward a "goal state." Also, the framework says nothing definite about the activation process: How does a given perceptual input, for instance, result in the activation of precisely certain rules and not others? Unless the theory is backed by a precise argument about activation, it is likely to become circular, assuming that an undefined "activation selector" does the main work of selecting out irrelevant thoughts. These technical problems, however, are not relevant to the points made in this chapter.

important to a description of everyday inductive inferences, as well as their usage in religious matters.

In "induction theory," a central strengthening mechanism consists in the "bucket brigade algorithm," which specifies a particular mode of interaction between different rules. In order to understand strengthening, the theory requires that we describe, not isolated rules, but chains formed by a combination of concatenated rules. Each rule activated, at any point, has precursors and successors. Rules are linked by the fact that the "*then...*" part of a rule or of several rules is the "*if...* part" of its (or their) successors; for example, "*If* the patient has a fever *then* she has an infection" and "*If* the patient has an infection *then* take a blood test." The bucket brigade algorithm specifies what happens when a rule wins a bidding competition, that is, when its "*then...*" part is "posted" as the representation of the current situation. The rule posted pays out part of its strength to its precursors in the chain. It therefore loses some of its strength. By becoming the precursor to another rule, however, it starts a new chain and will get back some strength value if that successor is posted. To sum up, chains of rules end up either with a winning rule, in which case all the precursors are strengthened, or with a defeat in the bidding competition, in which case all the precursors are weakened.13 Obviously, the process can be (and is actually) iterated indefinitely many times, each step representing a bidding competition with the resulting changes in the strength of the precursors.

The point of the algorithm is to account for the intuitively obvious fact that, on the one hand, assumptions that are commonly used and end up in a satisfactory representation of a situation will tend, all else being equal, to become more salient. Assumptions, on the other hand, which are not used with such results will be gradually weakened. A particularly interesting feature of the algorithm is that it shows why and how *strengthening goes backward* from the "posted" rule to its precursors. This important aspect of inductive processes can be illustrated with a simple example. Take for instance

the popular belief, pervasive in France, that overeating (or drinking) upsets the liver, not the stomach as is believed in other countries and in medical knowledge. The indigestion syndrome, including fatigue, nausea, and so on, is therefore described as "liver upset" (*crise de foie*), and people commonly claim that they "feel" that

13. This very simplified summary leaves aside the authors' mathematical formulation of the bidding system. Also, it must be noted that the "bucket brigade" is only one among several strengthening processes. It is cited here because of its relevance to our anthropological problems.

their liver is in bad shape. In the framework of induction theory, the reasoning involved here can be described as a chain of two inferences, namely "*If* one feels sick (tired, nauseated, etc.) *then* one's liver is upset" and "*If* one's liver is upset *then* the food/drink was too rich." Whenever the syndrome appears after a good meal, the latter rule is "posted" as the most plausible interpretation, thereby strengthening the precursor, the assumption that nausea and fatigue are symptoms of a temporary condition of the liver. In other words, every time people feel rather sick after a good meal, they are making the folk model more salient. This "backward strengthening" may explain why the belief is so deeply entrenched in French minds, and why it has so far resisted all attempts at refutation from the medical profession. Most people find the scientific arguments unconvincing, since they have experienced "liver upset."

This is where the framework described here is fundamentally different from the naive picture of induction that construes it as a tabulation of occurrences or as the production of generalizations from recurrent features. This view is insufficient if we want to account for the actual processes of strengthening. Obviously, many assumptions can be strengthened just by being confirmed. Observing many cats will certainly strengthen the assumption that they have tails and they like milk. Although this process of strengthening by confirmation is fundamental, the "bucket brigade" argument shows that assumptions can be strengthened in ways other than by making quasi-statistical inferences from a number of observations. To take the example of indigestion and its French folk model, cases of indigestion, however numerous, *never* confirm the assumption that eating causes "liver upset." The only hypothesis they confirm is that eating too much causes some trouble in one's body. In the subjects' minds, however, they tend to strengthen the folk model of indigestion as liver ache, which is used as a precursor to the interpretation of the situation. Obviously, this speculative model constitutes a set of suggestive assumptions rather than a full-blown theoretical framework. The important point, however, which justifies presenting the system in some detail, is that it makes it possible to formulate in a precise way some important properties of our anthropological data.

Credal Status, Salience and Probability Of Activation

Contrary to the "uncertainty" approach described above, this theory does not take the activation of a plausible assumption as a

process in which a person evaluates the subjective probability of a certain state of affairs. On the contrary, the plausibility of an assumption is a purely functional property, of which the subject is not necessarily aware. The different processing episodes in which an assumption is activated modify its credal status and salience, but these aspects of the assumption are not always (in fact almost never) the object of a conscious evaluation. In such a framework the activation of any nonschematic assumption should be considered a probabilistic event. To put it in the terms of induction theory, the measures of strength, match, support, and specificity result in the fact that a rule is more or less likely to be posted as a description of a given situation. There is of course no way to predict exactly what assumptions will be activated, beyond the most obvious ones, given a certain situation. As a result, the cognitive system that activates various assumptions does not constitute a fully deterministic system. The occurrence of any assumption is a probabilistic event, and the measures of strength and so on can be interpreted as factors that increase (or decrease) its initial probability.

The intuitive description, following which certain assumptions are more central or vivid than others, should be reformulated as the fact that the probability of their activation is higher than that of other assumptions.14 This probabilistic interpretation does not only provide a convenient idiom to describe the evidence. It also has some

consequences regarding the kind of causal explanation we may be looking for. On the one hand, if the activation of a certain assumption is a probabilistic event, it follows that we should not try to account for the fact that it occurs in a given subject in a given situation. On the other hand, we should try to account for whatever factors will make it more (or less likely) to occur

14. There may seem to be little actual difference between deterministic and probabilistic formulations, as far as most schematic assumptions are concerned. Take the above example of an encounter with a zebra. In a deterministic description, subjects are described as having a set of conceptual structures (including images, mental models, etc.) such that the presentation of a zebra will automatically activate the assumption "this is a zebra." The probabilistic interpretation would simply say that the probability of occurrence of this assumption is near 1. So far, the theoretical gain brought by the probabilities formulation seems small. Obviously, the probabilistic description of a system, where all events have a probability near 1, is always trivially similar to a deterministic description, so that in such cases the idiom of probabilities seems an impediment rather than a benefit. The situation seems different, however, if we turn to typical nonschematic assumptions. Given a certain set of experiences, and a situation where a cat is behaving in a particular way, some subjects may entertain the assumptions "the cat is doing this because cats are friendly." We must have a framework in which it is possible to express the fact that (1) not all subjects with similar experiences will activate that assumption, and (2) the same subject in a similar situation may not activate it either.

in a population of subjects, over a range of situations. Probabilistic descriptions allow us to leave aside the causal chain that leads to each occurrence and to focus on the trends that affect their distribution.

This, obviously, has important consequences for cultural phenomena. In this framework, explaining cultural representations does not imply producing causal chains that lead to a certain subject having a certain mental representation. What we must describe are the factors that increase the likelihood of the occurrence of those representations and thereby make them the kind of recurrent ideas we are studying.

Return to Anthropology: Constraints on Nonschematic Assumptions

At the end of chapter 2, I discussed what may be called the "problem of symbolism." In a given cultural environment, one can find a number of recurrent assumptions, made manifest in various utterances or actions, which have particular features such as intuitive unnaturalness, the use of categories with seemingly inscrutable characterizations, and inferential gaps in their implications. Most religious assumptions described in anthropological monographs display these characteristics. A theory of religious representations should therefore describe the mental representations underlying such assumptions, and describe them in such a way that their recurrence can be explained.

However seemingly remote from anthropological questions, the various models examined above have direct consequences for these questions. The consequences will be explored in detail in the following chapters. Without anticipating those arguments, it may be of help at this point to examine how our psychological argument can help reformulate some aspects of the anthropological problem. Counterintuitive assumptions, obviously, are nonschematic; they appear counterintuitive precisely because there is no causal nexus from which they could be inferred. To return to the Fang example used in chapter 2, the idea that witches fly on banana leaves is entertained without the background that would make such events intelligible in terms of everyday physics. The existence of apparently inscrutable categories and inferential gaps are also aspects of this nonschematic nature of religious assumptions. Inferential gaps are the consequence of the absence of a schema; inferences are usually

produced by activating the schematic part of the relevant conceptual structures, a part that in this case seems absent. Verbal labels that are attached to such entities are inscrutable because they do not denote entities for which a cluster of schematic assumptions can be activated. If this were all we could now say about religious assumptions, this excursus into psychological theories would amount to little more than a relabeling of the phenomena described in the previous chapters.

There is, however, more to say, and this will be more obvious if we turn to the question of *recurrence in* nonschematic assumptions.

Recurrence and Constraints On Inferences

Given a certain input, nonschematic assumptions are entertained, although they are not directly derived from the schematic assumptions that could be activated by that input. In this sense, they are under-determined by the input and the conceptual schema. This, however, does not entail that they are not *constrained* by the schema. On the contrary, it is possible to show that in most cases various nonschematic assumptions are in fact constrained by the properties of the schematic structures they are added to. In order to examine this point, we must once again turn to rather prosaic examples. As we saw above, it is necessary to include certain nonschematic assumptions in the stable representation that characterizes the concepts CAT and CONGRESSMAN. That is to say, if these nonschematic assumptions are not included, then it is difficult to understand people's stable expectations concerning cats' or congressmen's behavior. We must notice, also, that in such cases the nonschematic assumptions are not just *added* to the schematic core. In order to understand them, or to make inferences from them, one must have some representation of their relation to the schematic core. Take the example of cat behavior. The assumptions that describe cats as, for example, not "friendly" to humans, evoke a number of scenarios in which the cat's behavior is, for instance, constrasted with that of more owner-friendly species. Now each of these scenarios would be incomprehensible if one did not take for granted certain basic hypotheses concerning the fact that, for example, cats can memorize situations, they can distinguish between different people, they have basic needs and try to satisfy them, and so on. All such assumptions, which are part of the schematic core of the concept CAT, form the basis on which the

nonschematic ones can be elaborated. Moreover, the way nonschematic assumptions are constructed differs from domain to domain. To take a simple example, imagine observers who do not know much about either cats or cars. They observe, for instance, that a certain cat, when she comes across dogs, undergoes a series of remarkable behavioral changes (arched back, ears folded back, hair on end, etc.). They are likely to entertain the inductive generalization that such changes are general features of cats' reactions in the presence of a potential aggressor.15 Now, to turn to another domain, imagine that the naive observer is dealing with a particular car that has broken down twice when it was driven in the rain. The range of generalizations that could be entertained in such a case is much wider. It could focus on the fact that this particular car has a problem to do with insulation, or that cars of that make generally have that problem, or that it was a coincidence, and so on. In those two cases, the range of possible nonschematic generalizations is different. This is because the schematic assumptions are not the same for both concepts. In the case of CAT, they include the assumption that behavior toward other species is highly regular among exemplars of a living species. It follows that one can learn (or at least hypothesize) a lot about cats in general by observing only a few exemplars. In the case of CAR, it includes no such possibility, because mechanical defects can be typical of one exemplar (this car) or of a class (this make of diesel-engine cars) or of a still more inclusive class (all diesel-engine cars).

Two simple and important conclusions emerge from such examples. First, the fact that a certain nonschematic assumption is entertained implies that a selection is made between the indefinitely many assumptions that could be created as a response to a given situation. In other words, explaining what nonschematic assumptions are entertained implies explaining what constraints are brought to bear on their selection. Second, the schematic part of a conceptual structure imposes definite constraints on the range of nonschematic assumptions that can be appended to it. Different schematic cores will exclude (and by default tolerate) different nonschematic speculative additions.

These points are important because they provide a first step toward explaining the recurrence of certain nonschematic assumptions. A conjectural explanation, explained here in very intuitive terms, runs along the following lines. Nonschematic assumptions are likely to be enter-

15. Whether this generalization is true or not is of course irrelevant. What matters here is that it is plausible and likely to be entertained by most subjects.

tained to the extent that their plausibility is strengthened by the schematic assumptions of a certain conceptual structure, more than it is by the schematic assumptions of other conceptual structures. This can be briefly illustrated by returning to our examples. Typical recurrent assumptions about cats state that they are unfriendly (or in fact friendly, or devious, or cruel, etc.). Now all these, as I said above, are strongly constrained by certain schematic assumptions, such as that cats have basic mental states and mental processes roughly comparable to those of humans, and that behavior is highly regular within a given animal species. Ideas concerning cats' behavior are therefore compatible with schematic assumptions about ANIMAL SPECIES and INTENTIONAL BEHAVIOR. Now cats are also intuitively apprehended as types Of SOLID PHYSICAL OBJECTS, with all the properties attached to such objects (solidity, contiguity in space, continuity in time, occupation of a single location, etc.), so that the schematic assumptions concerning solid physical objects are necessarily activated in the presence of cats. My point is just that the ideas about their behavior are strengthened by the schema ANIMAL REGULARITY and INTENTIONAL BEHAVIOR more than they are by the schema SOLID PHYSICAL OBJECTS, though both are relevant here. To illustrate this, take the converse example of an assumption about cats that is not recurrent, for example, the idea that cats are friendly only on Fridays. This assumption is equally strengthened (or weakened) by all the conceptual schemata that could be activated about cats, as CATS, ANIMALS, PHYSICAL OBJECTS, OBJECTS, and so on. To sum up, the fact that the strength of a non-schematic assumption is modified by some conceptual schemata more than by others makes it more likely to be entertained, and therefore more recurrent.

Recurrence Of Nonschematic Assumptions

Our hypothesis, so far, is that the recurrence of nonsche-matic assumptions depends, at least in part, on their connection to schematic ones (and on the differences between their connections to various conceptual schemata). Now this seems to make the recurrence of religious representations incomprehensible. As I pointed out above, religious representations typically seem to activate *only* nonschematic assumptions. There does not seem to be a schematic core here. Fang people's notions of *evur* seem to comprise only nonschematic assumptions; there is no nexus of causally related assumptions that would

characterize *evur*, and this is precisely why the notion seems "inscrutable." But if no causal schema is activated, how could inferences about *evur* be constrained? In other words, how could we explain that only some inferences about *evur* are widespread, while others, if considered, are not recurrent? The framework proposed here would predict that, in the absence of schematic assumptions, the production of nonschematic ones is a matter of unconstrained imagination, so that their recurrence is a mystery.

There are three ways out of this difficulty. A classical anthropological reaction to this problem is to posit some abstract entities, the operation of which orients different people's inferences in fairly convergent ways. This is why people are commonly described as reasoning within the bounds of a certain "cultural model," "conceptual scheme," a "culture," or a "world-view." The idea here is that such abstract objects, which are not reducible to individual mental representations, are necessary (or even necessary and sufficient) to explain the fact that people's particular inferences do not vary randomly. This, however, is very close to a magical explanation, because of the puzzling underlying ontology. The idea that "cultural schemes" constrain people's thoughts implies that the former have a causal influence on the latter. Occurrences of thoughts, however, are material events, in the sense that they are an aspect of brain states. The only things that could have an influence on such physical events are other physical events and states, such as physical stimuli or other brain states, realizing other thoughts. It makes no sense to assume that a nonmaterial object, such as a "culture" or a "cultural scheme," could have material effects.16

This leads to a second possible way of dealing with the problem. In some descriptions of religion it is assumed that religious concepts are in fact schematic, that they are organized on the basis of a nexus of causally related assumptions. In this view, the puzzling features mentioned here (inferential gaps, etc.) are just the consequence of incomplete descriptions of the mental representations involved. This position, however, is not really satisfactory, for a number of reasons explained in chapter 2. The intellectual structures postulated in theologistic conceptions are simply *ad hoc* hypotheses; there is no independent evidence of their

16. This problem, of course, is only an artifact of a strange ontology. One must realize that "cultural schemes" and "world-views" and so on are only metaphorical names for combinations of thoughts actualized in many people's brains; as a consequence, it makes no sense to treat them as nonmental entities. The only things that

could constrain people's inferences (i.e., patterns of thought) are other mental entities.

existence. Moreover, as Sperber points out, most religious (or other "symbolic") assumptions are exactly the opposite of ordinary explanatory schemes, in that they maximize the number of hypotheses associated with a given input, instead of maximizing the number of inputs associated with a given hypothesis.

In the following chapters I will explore a third possibility. I will try to show that nonschematic religious representations are indeed constrained by some schematic assumptions. These, however, are not to be found in the religious domain itself; they pertain to other domains of cognitive activity. I will try to show that the recurrence of certain religious representations is caused by the fact that they are more strengthened by certain schematic assumptions than by others. In order to show this, we must of course identify the conceptual schemata activated and describe their contribution to the strengthening of non-schematic religious assumptions. The story, unfortunately, is made slightly more complex by a fact I mentioned above; the connection between schematic and nonschematic assumptions may well be different from one conceptual domain to another. This is why we will have to consider the four "repertoires" of religious representations in turn, in the next four chapters.

TWO
FOUR REPERTOIRES OF RELIGIOUS REPRESENTATIONS

4
Natural Ontologies and Supernatural Furniture

Ontology is the description of the various kinds of things that exist in the world, of what philosophers call the "furniture" of the world. To take a simple example, a difficult ontological question concerns the existence and the status of numbers, that is, as either real entities in the world or recurrent properties of classes or mental categories imposed on phenomena. Here I will not mention such philosophical debates. I will be concerned with the relationship between two types of speculation about the different sorts of things there are in the world. First, I will examine *natural ontologies*, that is, the spontaneous assumptions humans entertain about ontological categories. This will then be compared with assumptions about religious matters, about what sorts of nonnatural entities and processes are assumed to exist. I will leave aside the question of whether spontaneous natural ontologies and supernatural religious ones are of any philosophical relevance, that is to say, whether they really pick out the fight sorts of things in the world or are dramatically on the wrong track. This question is a matter for philosophical discussion and has no bearing on the kind of processes described here. What we want to find out is whether the ontological assumptions that are implicit in people's religious representations are constrained by universal cognitive mechanisms, and exactly what those mechanisms are. If religious assumptions can be seen to be constrained by intuitive ontologies, then this may account for the recurrence of certain particular

features in the "supernatural furniture" imagined in many different human groups.

Explicit and Tacit Assumptions

Ontological assumptions often seem self-evident to most human minds. As a consequence, they are rarely if ever described or mentioned in anthropological monographs. For the same reason, the way they are acquired and transmitted is generally neglected by anthropologists. In the following pages I will contend that such assumptions, which are necessary to the construction of religious representations, could not be extracted from cultural material unless the subject had strong presumptions about their content. Such presumptions are not trivial; they are necessary in order to account for some recurrent properties of religious representations.

In this and the following sections I will use an example from Fang religious notions to illustrate what is in fact a very general and indeed a very simple point about religious constructions in general. The consequences of this simple point, however, are seldom envisaged in anthropological theories. People's inferences go beyond what is given by the cultural input, and they do so in a way that is directed by prior cognitive structures.

An Illustration: Fang Ghosts

Let me take the example of the Fang (Cameroon) notion of *bekong* briefly mentioned in chapter 2. Fang people consider the forest to be peopled with wandering shadows, the spirits of the dead. They live in invisible villages, which some people assume to be underground, and breed wild animals, in the same way that the living breed pigs and poultry. Many people report encounters with the *bekong*. A fleeting shadow is seen in a clearing, or a chased animal suddenly vanishes from sight. Such encounters typically occur in liminal spaces (a clearing, which is neither forest nor village) and at liminal times (dawn and dusk), though this is far from general. Folk etymology links the term *kong* with the verb *kon* or *kong*, "to grow hard, tough," which designates primarily the growth of trees, and also metaphorically that of humans, particularly of

boys into men. There is considerable ambiguity about the exact process through which death transforms people into *bekong*. What is certain, however, is that a component of the person leaves the body and has all the intentional properties of the mind of the deceased. There are two stages in the destiny of the ghost. It is first a wandering presence, generally malevolent. After a certain time (typically a few months) the deceased is given a proper funeral. The ghost is then supposed to become an ancestor in the proper sense. The difference between wandering ghosts and "stabilized" ancestors is reflected in both linguistic usage and people's expectations. The ghosts are always considered as an undifferentiated *mass* of agencies; the ancestors on the contrary are often identified as particular persons, whose action is determined by their genealogical link to various social groups. While the ghosts are generally seen as potentially harmful, the ancestors protect their groups.

None of these notions should be taken too strictly, as a "doctrine" of the soul and its destiny. The propositions above typically emerge from people's statements about *bekong*; they do not constitute an integrated system. This is not because our ethnographic information about the Fang in insufficient, but more simply because these notions are extremely vague and ambiguous for the Fang speakers themselves. The Fang generally consider that questions concerning the origin and behavior of the ghosts are particularly obscure. Only certain qualified speakers, such as religious specialists, make definite statements about these matters, and even they often qualify them with such comments as "these things are obscure," "we are only repeating what our fathers told us," and so on.

Not all principles, however, are marked with vagueness. There is a core of general principles which are held by most people and considered definitely true. They focus on the physical properties of the ghosts and the type of observable phenomena that can be brought about by their action. To start with their properties, everyone characterizes the ghosts as invisible and intangible beings. The encounters mentioned above are interpreted as situations in which a ghost wants to send a signal to the living or wants to be noticed for some reason. Apart from such occurrences, the presence of the ghosts is in principle undetectable. In dreams or in a trance, people can also "meet" ghosts, though in such cases there is often a certain reluctance to admit that the encounter was real. Ghosts are also described as intangible, in the vague sense that they can go through physical obstacles. Moreover, they are described as able to move extremely fast, although no one ever supposes that they could be in two places at once. In accordance with what I said in chapter 2 about in-

ferential gaps, the implications of such principles, even their entailments, are often surrounded with uncertainty. Although everyone is quite definite that ghosts usually cannot be seen and that they are never hindered by physical obstacles, no one ever speculates on the practical implications of such capacities. The way these seemingly immaterial entities can eat, drink, or domesticate animals is mysterious, although it constitutes a mystery in which no one seems to show much interest. This in fact is a very common feature of such representations. As M. Fortes put it, even elaborate ancestor cults are often combined "with the sketchiest lore about the mode of existence of the dead .... Religious beliefs and practices can be carried on perfectly well without a doctrine or lore of the nature and mode of existence of the "beings" to whom they are ostensibly directed" (Fortes 1987, 70-71).

Yet the effects of the ghosts' actions are of considerable interest and the subject matter of frequent statements. It is assumed, and explicitly stated in many occasions, that ghosts can "throw" illnesses at people. The causes of the ghosts' anger are diffuse, although two themes are particularly recurrent. First, people often speculate about the resentment of the dead against those who still enjoy the pleasures of village life. In a more sinister way, a ghost can be angered at a particular person who used witchcraft against him or her. It is generally assumed that proper funerals should mitigate such problems. In the Fang nosology, such situations constitute an explicitly recognized etiological category. There are ritual specialists and prescribed ritual remedies for such diseases, which include many types of misfortune beyond somatic illnesses.

This constitutes a very concise summary of what most Fang people accept as valid statements concerning the *bekong* and their action. This series of principles constitutes not a "theory" but an organised set of expectations concerning the ghosts. Before proceeding any further, I must insist on two general characteristics of the principles. First, they include *counterintuitive* claims, which are clearly treated as such by everyone. That some beings can go through obstacles, become invisible, or keep wild animals the way humans breed the domesticated species are principles that are explicitly treated as out of the ordinary. Second, the transmission of such principles is not particularly difficult to describe. Many of them are explicitly stated as valid generalizations, such as "the *bekong* live in the forest," "dead people become *bekong*," and so on. Others can be acquired by generalizing over repeated instances. For instance, one seldom hears the general statement "the *bekong* can provoke misfortune"; its application to a singular case, however ("the

bekong caused this precise state of affairs"), is frequent enough to suggest the generalization even to very lazy inductivists. This, obviously, does not mean that all aspects of ghost behavior are equally familiar or even equally available to everyone. For instance, ritual specialists are the only persons who know the signs by which one can tell a *bekong-related* misfortune from a case of witchcraft or of "simple" somatic disease. My point, however, is that even in such cases transmission is not a puzzling fact because it requires only a minimal memory for explicit principles, and a minimal generalizing capacity for the implicit ones. Apparently a simple inductive device could acquire such notions.

Why Inductive Learning Is Problematic

Things, however, are not that simple. The statements and inferences described above are themselves based on a number of background assumptions about the kind of entity the ghosts are and the way one can generalize about them. Consider for instance the assumptions that can be acquired by producing generalizations on the basis of particular instances. On the one hand, in the Fang intellectual environment there is very little explicit general discourse about such questions as ghosts or witchcraft. On the other hand, there is a substantial material constituted by people's statements about singular cases.1 So anecdotes, memories, statements made by ritual specialists constitute a rich source for information concerning the ghosts. They are a source, that is, only if one can actually infer from them; only if one can generalize on the basis of the singular situations they described. This is where the acquisition problem becomes more complicated. In the above section, I described the acquisition process, in such cases, as what a "simple inductive device" could achieve. This is somewhat perverse, however, because there is no such thing as a simple inductive device, and in fact there cannot be such a device. Without going into the philosophical detail of why this is so, I must insist on a few elementary principles, to which I alluded in chapters 1 and 3.

An inductive machinery makes it possible to produce general principles out of singular occurrences. To take the commonsense view of

1. This of course is a general fact about religious discourse in nonliterate traditions; it is often more "event-oriented" than "theory-oriented," at least in its explicit content. There is, however, no shortage of events remembered and interpreted (Boyer 1990, chap. 1).

how generalizations are produced, one experiences a variety of situations and then picks up whatever features are recurrent, using these features as the basis of the general model. This process of generalization is usually taken as both simple and passive, implying that (1) the inductive process consists of a rather elementary tabulation of recurrence, and (2) that it is the world, as it were, which chooses what the generalizations are about. Subjects are presented with situations in which many contingent features present considerable variations and a few features present some overall similarity. The subjects merely detect the latter and neglect the former. Many ravens are seen and most of them are black. Yet the height at which they fly and the number of eggs they lay are variable features, and therefore do not give rise to generalizations. This view of inductive learning is pervasive in cultural anthropology, perhaps because it constitutes the commonsense conception of learning through examples. It is also the subject matter of classical experimental studies of induction, such as that of J. S. Bruner, J. J. Goodnow, and G. A. Austin (1956). Most of these studies aim at describing "concept-learning," which is understood as some form of context-independent generalization over exemplars. In this paradigm, "categories are built and modified by incrementally comparing the features of the category with features of new instances" (Schank et al. 1986, 640).2

In chapter 3, I described the paradoxes generated by similarity-based models of conceptual structure. For each concept, they must presuppose a certain selection of pertinent features and a weighing of the features, which are in fact consequences of the conceptual structure that is studied. In a similar way, the classical view of inductive learning is faced with a simple logical problem. In order to produce generalizations on the basis of instances, one must select what features of the instances will be the object of a quasi-statistical tabulation, among the indefinitely many features that can describe a particular object. One must therefore have some representation of a certain property, or class of properties, as "projectible," to use N. Goodman's term (1954, 1972). This is why Goodman insists that inductive generalizations are problematic in two ways. The *confirmation* (or Humean) problem is that confirming instances, however numerous, never guarantee the general validity of an

2. Schank takes this as the main weakness of the paradigm, as well as its reliance on the "classical view" in the description of conceptual structures. Another example oft his framework is P. H. Winston's (1970) classical approach of induction as problem in artificial intelligence. There are many problems with these models, which do not constitute psychologically realistic descriptions of inductive learning.

inductive generalization. However many white swans are observed, they never exclude the possibility of black swans. The *projection* problem is subtler, but in fact more directly connected to our anthropological question. Given a set of instances, we take them to confirm or disconfirm a certain general principle, in that they display a certain feature or not. Each instance, however, confirms indefinitely many hypotheses. Each white swan confirms not only that swans are white but also that they are either white or blue, that they are white only if they have wings, that they are white only if you look at them, and so on.

Some aspects of the projection problem are relevant to many everyday situations in which inductive generalizations are produced. Children observe exemplars of living species and entertain general hypotheses about their appearance or behavior. It is remarkable, as I will show below, that such hypotheses are selective, that they focus on a limited number of features among the many aspects of the animal they attend to and memorize. Some aspects of cultural representations, like some aspects of knowledge in general, can indeed be acquired through inductive generalization, on the basis of confirming instances. Saying this, however, does not amount to saying much unless we have a good description of the background structure that makes it possible for the system to attend to particular features and generalize over them. This background structure is what we must now try to describe in the domain of religious representations.

Tacit Assumptions: The Fang Example Again

Let me return to the example of the Fang ghosts. As I said, there is no shortage of material, in terms of anecdotes and more or less mythical stories concerning the ghosts. The problem is to determine what hypotheses are derived from these singular cases and what background structures make this generalization process possible. The various stories and anecdotes about the ghosts, for instance those including encounters with them, combine two kinds of features. On the one hand, there is a mass of details that contribute to the eerie overtone of the stories. The ghosts are depicted as shadows that suddenly disappear, as people who can be heard but not seen, and so on. The context, too, is meant to emphasize the uncanny character of such encounters. For instance, the narrator is on his or her own, far from the village, often lost in a dark patch of the forest. On the other hand, such stories also contain

descriptions of the interaction between the ghosts and the living. The hero and narrator of the anecdote gives them some meat, the ghosts make him promise never to hunt certain animals again, and so on. In the same way, the ritual diagnoses made by specialists about a particular case of *bekong*-related misfortune include both uncanny details and description of why the ghosts did what they did, what they want of the living, and so on.

For obvious reasons, it is mainly this latter aspect, the description of interaction, which gives rise to serious inductive generalizations. The details concerning the kind of setting where ghosts can be encountered are not the object of much speculation. One anecdote or ritual statement describes them as dwelling near dark puddles in the forest; another one as creatures that can be met in clearings. No one speculates much on what can be concluded from such details. The typical behavior of the ghosts, however, is inferred from all this narrative material. People who hear stories and ritual diagnoses draw general inferences from them and can often cite the original source as evidence for the principle they use. The reasons why people generalize about behavior and neglect typical settings are simple enough. Given what the *bekong* can do to the living, it is quite crucial to understand what they do, why they do it, and what one can expect from them. The details about their eerie appearance, however baroque, pale in comparison.

People can take singular episodes and ritual statements as the basis for hypotheses about ghosts in general, first of all because they understand ghost behavior in *psychological* terms. This requires a set of principles which are both tacit and indispensable. No one states them, no one is even aware of them, yet the stories would make no sense if they were not activated. For instance, it is necessary to assume that the ghosts have psychological mechanisms such that they can perceive what people do, form some beliefs on the basis of those perceptions, and store those beliefs in memory. It is also assumed, for instance, that the ghosts have mental capacities such that, if they find a certain state of affairs E to be desirable, and know that another state of affairs, C, is necessary to achieve E, then they will desire to achieve C. For instance, the ghosts are described as *wishing* that certain rituals were performed. They are described as *knowing* that people, if afflicted by misfortune, will eventually oblige. They are said to *decide*, in consequence, that some illness should be "sent" to the living. When people are making inferences from the partly explicit cultural material that is given, they necessarily rely on such abstract principles, describing the ghosts' putative psychological mech-

anisms. These principles are not given in the utterances and other types of explicit information on the ghosts. They are not "implicitly" transmitted either, in the sense that they could be readily deduced from that explicit information. On the contrary, it is because they are assumed to be valid in the first place that further inferences about the ghosts' behavior can be drawn at all.

Default Values and Transmission

It may seem unnecessary, perhaps even slightly absurd, to insist on such principles, which seem extraordinarily self-evident to any observer and would certainly seem equally obvious to most actors concerned. After all, one would be really surprised if ghosts were described as desiring an effect E, knowing that its condition is C, and *not* desiring C. Because they are self-evident, such principles are not usually mentioned in anthropological descriptions of cultural knowledge. For the same reason, they need not be transmitted either explicitly or implicitly. They constitute *default values*, that is, principles that are invariably assumed to be true, in the absence of any explicit information to the contrary. Fang people generally assume that a *person* who wants to achieve E and knows that "no E unless C" will be led to desire

C. Because no specific information is given to the effect that such principles do not hold for ghosts, people spontaneously apply them to the ghosts' mental processes.

Obviously, spelling out the default values in a conceptual system is an unrewarding exercise, in that it requires that we dwell on the banal, if not the platitudinous. This, however, is indispensable in order to have a psychologically realistic description of acquisition. Such a description also makes it possible to show how closely the questions of under-determination and naturalness are connected. The very material that seems to be represented without being transmitted is also held to be self-evident, to consist in assumptions that people would "naturally" hold, in the absence of explicit contrary information.

It is generally assumed in cultural anthropology that some aspects of religious representations must be culturally transmitted because they are so unnatural that they could not appear in human minds without cultural tuition. The idea of witches flying about perched on banana-leaves is probably not innate and probably does not come from actual experience of witches. So it must be culturally transmitted. This much is obvious. Here, however, we are describing another aspect of religious

representations, a set of ideas which have exactly opposite properties. They are so natural that people will always take them for granted, will take them as default values; moreover, they do not seem to be "transmitted" in any sense.

The transmission of religious representations is likely to involve a complex interaction between culturally transmitted, on the one hand, and nontransmitted, spontaneous assumptions, on the other. However seemingly trivial, this point must be stressed, because it leads to a fundamental question: what role do such spontaneous principles and inferences play in the recurrence of certain aspects of religious representations? In the following sections, I will try to show that nontransmitted assumptions not only constitute a background, against which the explicit, counter-intuitive assumptions can be understood but, in a more specific way, they impose strong constraints on the range of counterintuitive assumptions which can be entertained.

Ontological Categories in Cognitive Development

In order to go further in the description of those "default values," it may be of help to turn to the developmental literature. Ontological assumptions are not only crucial in the representation of supernatural agencies, or in philosophical disquisitions about the existence of universals, but they provide the indispensable frame in which conceptual development can take place. Moreover, developmental studies provide particularly clear illustrations of the ways in which those assumptions are represented and constrain the range of beliefs subjects can entertain about a given object.

Keil and The Ontological Tree

Research into the representation of ontological distinctions was initiated by F. Keil (1979), applying notions derived from F. Sommers's study of the ontology of ordinary language (1959). Sommers's strictly philosophical argument focused on two points. First, ontological distinctions are made manifest by predicate restrictions. Not all predicates can be applied to a given term, and the applicability of a

given predicate allows one to predict the applicability of others. If it is possible to say that a given X "is breathing," then Xs might also, in certain cases, be "furious," but Xs could certainly not be described as "difficult to make" or "happening tomorrow." The selection restrictions, in this case, reflect an ontological distinction between animate objects, artifacts, and events. Second, ontological categories like ABSTRACT OBJECT, LIVING THING, ANIMAL, EVENT, and so on are arranged in a taxonomical tree according to precise formal constraints.

Keil's experimental research (1979, 1986), which focuses on the evolution of ontological distinctions in small children, tends to confirm Sommers's general hypotheses. There is good evidence for the existence of mentally represented ontological distinctions, which are arranged in a strict taxonomical manner (although the categories and their arrangement

are slightly different from Sommers's tree). The formal constraints are respected even at an early stage. Children appear to make surprisingly fine-grained ontological distinctions, such as between LIVING THINGS and ARTIFACTS, and they have precise intuitions on whether a predicate can or cannot apply. The ontological "tree" is gradually developed by branching out. For instance, a broad category like is gradually refined, so that after a while some predicates apply to plants only, to human beings to the exclusion of other animals, and so on. The main conclusion to draw from such studies is that precisely organized ontological distinctions play a crucial role in the way people represent concepts.

The most important aspect of these studies, and a highly relevant point to anthropological models, is that ontological assumptions can be studied independently of the subjects' "conceptions," "models," or "theories" attached to each concept. Indeed, some of Keil's experiments show that it is possible for subjects to make ontological hypotheses about some objects on which they have very little information. Keil used stories that make a passing mention of objects called "hyraxes" and "throstles," which were never defined or described. The only thing that is said about them is that the hyraxes "are sometimes sleepy" and that the throttles "need to be fixed." Kindergarten children who have never heard of those objects nevertheless tend to infer, on the basis of such sentences, that it is possible that a hyrax might be "hungry," and that a throstle might be "made of metal"; on the other hand, they consistently deny that a hyrax could be "made of metal" (Keil 1986). While no "theoretical knowledge," nor indeed any general information, is communicated, the ontological distinction between LIVING SPECIES and ARTIFACTS makes it pos-

sible to generate some inferences about the entities mentioned. "Hyrax" and "throstle" are used without explicit information about their onto-logical status (live being and artifact respectively). No "theory" about them is given to the listeners. The acquisition of such notions, and the construction of some elaborate ideas about what they are likely to denote, are a consequence of the subjects' disposition to infer precise ontological hypotheses whenever a term is used in a natural context. Like other such inferences, these are merely assumptions, which can be refined or corrected in the light of subsequent utterances. This is crucial, because if the range of predicates is restricted, the range of possible beliefs about the entity is *ipso facto* reduced. Accepted as a conjecture, an ontological assumption automatically excludes a large domain of possible inferences about the objects concerned.

Ontologies and Transmission

This last point has far-reaching consequences for the study of religious assumptions. As I pointed out in chapter 1, anthropologists often take for granted the principle of exhaustive cultural transmission. The representations that are widespread in a human group are necessarily acquired through cultural transmission. Among these representations there are a number of ontological assumptions concerning the existence of nonobservable entities. Some of these are tacit assumptions, which are not available to the subjects, yet govern their intuitions and expectations concerning religious entities. What developmental studies show is how such assumptions can be spontaneously formed by subjects, even in extreme conditions in which (1) there is no prior information concerning an entity, and (2) the young subjects do not have any explicit ontological categories. One could therefore assume that such spontaneous hypothesis formation will be *a fortiori* relevant in the acquisition of religious notions. At the age when they start to entertain definite expectations concerning religious entities, subjects already have more precise onto-logical assumptions; moreover, the notions are the object of frequent utterances, so that they are not used in a conceptual vacuum, like the notion "hyrax" in the experimental studies.

In the following sections, I will try to examine the consequences of this point for the acquisition of religious representations. Before going further in our description of religious acquisition, however, we must examine in more detail the consequences of this approach. What Keil's studies and other developmental experiments show is that it is not

difficult for subjects to make precise conjectures concerning the onto-logical status of an entity they know little about. But we must consider the implications of such conjectural classifications. The fact that a certain religious entity is classified in the same "slot" as other, observable realities certainly has some consequences for the ideas one can entertain about that entity. I described those consequences as a limitation in the range of beliefs one can entertain about the entity.

We must go further and try to describe exactly what positive expectations are inferred from ontological categorization.

Intuitive Domain-specific Assumptions

The problem here is to understand whether different ontological categories correspond to functionally different ways of acquiring knowledge and structuring experience. This point is crucially, though indirectly, relevant to our problem concerning religious notions, for the following reason. If broad ontological categories correspond to significantly different ways of handling and structuring data in the course of conceptual development, this might suggest that a series of domain-specific principles constrain possible beliefs about each type of entities. In the next section I will turn to a series of recent developmental studies that converge toward this conclusion.

Constructivism and Domain Specificity

The studies mentioned here tend to move away from a classical, Piagetian account of conceptual development. This move concerns not only specific results or details of the developmental scenarios but also some fundamental tenets of the classical picture. An essential starting point of the constructivist Piagetian account is that conceptual development can be characterized in terms of formal operations that apply across domains. That is to say, a given developmental stage is characterized by the availability of a given set of structural principles (e.g., conservation, mechanistic causality), which are applied in a similar way in all domains. Once a principle is available, it is supposed to be used across ontological categories. Conceptual development works by a pro-

cess of structural complexification, in which all domains of knowledge evolve in roughly parallel ways.

Against this "classical" picture, the studies I will examine here suggest that development in different conceptual domains may take different paths. A good illustration of this type of model is Keil's series of studies on the "characteristic to defining shift" (Keil 1986). Young children tend to understand concepts on the basis of characteristic features, and only gradually do they elaborate defining features. This shift was described, in the classical framework, as a general evolution from concrete to abstract representations. The experiments, however, show that the shift does not occur at the same time for different domains. For kinship terms, names for artifacts, and terms designating activities, the shift occurs at different stages of cognitive development. The fact that a given structural principle is available in one domain does not imply that it is applied to other domains, so some important qualifications should be added to the notion of domain-general developmental stages. Moreover, if domain-specific principles are involved in the acquisition and structuring of data, these principles are not exclusively definable in formal terms. They must include some description of the type of entities or processes they apply to. They must carry some semantic information.

Developmental research on such specific principles has focused on many different domains (for a general survey, see Atran 1989). Here I will mention only a few domains that are of particular relevance to religious assumptions. They concern the representation of certain properties of physical objects and motion, of the particular features of living things, and of mental entities and processes. Each of these domains seems to be structured by principles or presumptions that develop early and seem relatively independent from the structuring principles of other domains. These principles constitute what is often called "intuitive" or "naive" theories (as opposed to scientific theories). They are generally implicit and seem to play a crucial role in the development of later, partly explicit representations of the domains concerned.

Naive Physics

One of the early contributions to the study of "intuitive physics" was M. McCloskey's series of experiments with subjects' intuitive predictions concerning the paths followed by objects (McCloskey 1983). For instance, subjects were asked to plot the path of a ball rolling toward the edge of a cliff and falling over. In most experiments,

McCloskey found that the subjects' predictions do not usually converge with those of scientific physics. They seem to

obey a pre-Newtonian notion of "impetus" which combines force and motion. According to McCloskey, the theoretical principles underlying the subjects' intuitions constitute a naive "theory of motion" with principles that are as sophisticated and constraining (if not as accurate) as those of scientific physics. This latter point has been the object of some controversy, since the subjects' intuitions seem to be constrained not only by such principles but also by their familiarity with the type of situation described (Kaiser, Jonides, and Alexander 1986). Without denying the existence of certain constraining principles, I find it more economical to avoid the notion of an "articulated theory" in the description of such presumptions. According to A. DiSessa (1988), the principles in question are much less systematic and articulated than McCloskey's description may suggest. Rather than theoretical principles, they constitute "phenomenological primitives" directly abstracted from common experience. The combination of force and motion in the intuitive notion of impetus may be just one of those primitives. In DiSessa's formulation of a "fragmented" conception of intuitive physics, different (and potentially conflicting) primitives are activated in the context of different problems.

Developmental research may shed some light on the structure of those implicit presumptions. Studies of infant expectations on the trajectories of physical objects tend to show that some (not all) presumptions that constrain adult expectations are in fact present at a very early age. For instance, the principles of continuity (objects move in continuous paths) and solidity (objects do not coincide in space) seem to be present in children as young as four months (Baillargeon 1987; Baillargeon and Hanko-Summers 1990). Also, the Piagetian principle of "no action at a distance" and the connected distinction between causal and noncausal relations between movements seem to develop in infants long before there is any sensorimotor experience that could support it (Leslie 1979, 1988). Other principles, for example, that unsupported objects go downward and that objects that meet no obstacles continue to move, appear later (around six months), although this is still long before the developmental stage associated with such operations in the classical Piagetian account (Spelke 1988, 1990). These studies are probably not enough to adjudicate between a "theory-based" and a "fragmented" account of adult competence. More importantly, however, they converge in suggesting that, from a very early age and in the absence

of much experiential basis, a series of implicit presumptions orient expectations concerning physical properties of solid objects.

Animate Objects, Living Kinds, and Essentialism

Another domain that seems structured by specific principles is that of living kinds. Important distinctions between expectations concerning living beings as opposed to artifacts, and animate as opposed to inanimate objects, are present from an early age, as Keil's data (see above) seemed to indicate. Such differences are not only classificatory, they have direct effects on the way children make inferences, especially inductive projections on the basis of singular examples. To take but a very brief example, in an experiment by S. Gelman and E. Markman, four year olds are shown pictures of dolphins and tropical fishes and told how these animals breathe (above the surface and underwater respectively). They are then shown some pictures of a shark, which looks much more like the dolphin than the tropical fish presented, but is presented to them as a type of fish. When asked how sharks breathe, most of them correctly infer, against the perceptual resemblance, that they must breathe in water (S. Gelman and Markman 1986, 203-205). Moreover, children seem to make such kind-based inductive generalizations more easily if the properties chosen are "inherent" properties of the exemplars, such as ways of breathing and feeding. They do not easily extend properties like the weight of a given animal or the fact that it moves fast (S. Gelman and Markman 1987; see also S. Gelman 1988).

In other words, the implicit ontological category LIVING KIND carries quasi-theoretical assumptions about the underlying causal structure that makes animals different from, for instance, artifacts. These theoretical assumptions are also manifest in children's reactions to putative scenarios of transformation from one kind to another. Such transformations are judged more plausible between types of artifacts than from one living kind to another, even in cases where an animal is described as having acquired the other's outside appearance or behavior (Keil 1986). At a very early stage, children seem to be already reasoning on the basis of what Medin and A. Ortony call the principle of "psychological essentialism," that is, the belief that "category membership [depends] upon the possession of some 'hidden' . . . properties of which observable properties are but typical signs" (Medin and Ortony 1989, 184). Obviously, the child's commitment to such a principle is under-determined

by experience, since kind changes are observed as rarely for artifacts as for living kinds.3 This principle may be interpreted as an enrichment of a deeper principle, which establishes a fundamental difference in expectations concerning animate as opposed to inanimate objects. There is considerable evidence that this distinction is present even in infants (R. Gelman, Spelke, and Meck 1983; Bullock 1985a; Richards and Siegler 1986). It seems to be grounded in an early sensitivity to the difference between self- and non-self-generated movement in physical objects (Massey and R. Gelman 1988). In other words, even if essentialist principles develop over time, and are enriched by various "micro-theoretical" assumptions, they require presumptions of differences in causal structure which appear very early.

Intuitive Psychology

The spontaneous interpretation of other people's behavior is consistently directed by implicit principles concerning motivation, intentions, memory, reasoning, and so on. It can be shown that some of these principles are domain specific. Moreover, some of these assumptions appear early enough to be construed as orienting principles, which structure experience, rather than generalizations inferred from experience by some cross-domain inductive mechanism. Two distinctions, however, must be made in order to clarify what constitutes an "intuitive theory of mind."

First, as J. W. Astington, P. Harris, and D. R. Olson point out (1988, 4), having such an intuitive theory is not the same as having an explicit, integrated theory of the mind as a functional whole. This is especially clear in young children, who obviously do not have the latter. Without an explicit psychology, however, they have assumptions concerning the mentalistic explanation of feelings and actions. They do not easily manipulate such terms as "mind," "memory," "thought," and so on, and they can make mistakes about the meaning of adult utterances concerning those entities. However, their interpretation of what people do and say is governed by precise assumptions concerning the way mental

3. In many cultures, notably in modem Western countries, animal metamorphoses are the basis of an extensive folklore and constitute one of the main ingredients of bedtime stories. It is remarkable that such consistent indoctrination does not seem to influence the children's intuitions. Although the subjects are familiar with the *notion* of an animal transformed into another onea frog into a prince, etc.they nevertheless are quite consistent in their judgment concerning the unnaturalness of such transformations in real objects.

representations are acquired and stored, the way people's intentions direct their behavior, and so on.

A second distinction must be made between implicit assumptions concerning mental contents (the intuitive "theory of mind" or "psychology" proper) and a host of explicit assumptions concerning more complex aspects of mentation (what is often called a "folk psychology"). To give a simple example, it seems obvious to any human subject, from a very early age, that other people's minds perform practical syllogisms. A default value in the intuitive explanation of behavior is that "all else being equal, if people want a state X and know that 'no X without Y,' then they are led to want Y." Although few subjects represent such assumptions explicitly, they use them constantly in their explanations of other people's behavior. In all human groups, however, intuitive psychology is complemented with a host of specific principles concerning more complex aspects of human behavior. They focus on such domains as motivation, personality types, the likely effect of certain situations on people's temperament, and so on. To take a simple example, people in the United States often produce inferences based on the following principle: "weak-willed people, if they want X and know that 'no X unless ¥' but find Y hard to achieve, will give up on X unless they really have a strong desire for that X." This type of dynamic explanation is part of a series of hypotheses which are often explicitly represented and used in argument. Here I will discuss only assumptions of the first type, which are particularly relevant to our problems of religious assumptions.4

Intuitive principles comprise a number of assumptions about mental objects and their dynamic interaction. Because they are intuitive, are self-evident, and make it possible to complexify one's knowledge of other minds, such assumptions are best elucidated by developmental re search. Their effect is clearer in subjects who have no explicit vocabulary to express them and no awareness of their use in particular explanations. A host of recent experimental research highlights the early appearance and complexity of the preschooler's understanding of mental processes (see Astington et al. 1988; Wellmann 1990; Perner 1991; Whiten 1991). To consider only the most fundamental results, even small children seem to conceive mental entities (thoughts, feelings, dreams) as immaterial objects; this goes against the classical Piagetian notion of

childhood realism, following which children do not distinguish

4. On such theories of the mind, see the various studies in P. Heelas and A. Lock 1981. There is no space here to discuss this important work, which focuses on explicit, and culturally variable, notions of thought, self, memory, etc.

between objects and their representation (Wellmann and Estes 1986). Moreover, children have rudimentary, yet precise notions concerning causality in mental events. They know that perception causes beliefs, which can cause intentions, and that these causal links are not reversible. This is, to a large extent, congruent with R. D'Andrade's description of adult Americans' implicit notions of causation in mental processes, a "causal schema" that seems to be operative in very different cultural environments as well (D'Andrade 1987, 141-146).

To take a particular aspect, which is the object of much experimental work, normal adult intuitive psychology includes the assumption that a human mind stores descriptions of states of affairs that the person believes to be the case. Yet these descriptions may be mistaken. In other words, people can be construed as sometimes acting on the basis of false beliefs, wrongly judged by their holders to be true. This principle is particularly interesting because it seems to appear only at a precise point in the course of conceptual development, before (roughly) the age of five. In classical "false belief' tests, children are shown, for example, a doll X who hides a marble in a basket x, and goes offstage. Then a doll Y comes over, finds the marble, puts it in box y, and goes off. When doll X comes back, children are asked in which container it will look for its marble. Three year olds consistently predict it will look inside box y, while five year olds assume it will look for the marble "where it thinks it must be..."that is, in basket x (autistic children do not seem to make that prediction, whatever their mental development: Leslie and Frith 1987). It is still unclear exactly what conclusions can be drawn from these experimental results. There are a number of uncertainties concerning the underlying mechanisms activated in such contexts. For instance, young children who fail the test (three year olds) nevertheless have an elaborate understanding of pretense (Leslie 1987). Given such conceptual means, it is difficult to understand why they fail to make the right prediction. Beyond such problems of interpretation, however, the important point here is that the effect is stable, and it indicates a change in the way intuitive principles are activated in the interpretation and prediction of behavior. Such changes are obviously under-determined by experience. Interactional routines do not change between the ages of three and five in a way that could account for this shift in interpretative strategies; the adult explanations of behavior, from which the child could take inspiration, have not changed either. Furthermore, cultural variations do not seem to have any effect on these phenomena. For example, J. Avis and P. L. Harris replicated the American false-belief tests on

Pygmy children and found the same shift at the same developmental point (Avis and Harris 1991).

These principles constitute what philosophers call "belief-desire psychology," a set of tacit principles and expectations which govern our understanding of mental phenomena and observable behavior. Obviously, these principles do not constitute a full-blown psychology.5 They nevertheless form the basis on which subjects construct all ordinary causal attributions. Beyond these basic principles, one can find all the complex hypotheses mentioned above regarding more specific aspects of mentation, intentions, decision, and so on. It is remarkable, however, that this explicit speculative psychology never violates the core principles. It constitutes an extension and a refinement of belief-desire principles, as well as a series of conjectures on more complex domains, such as personality.

General Remarks

Let me now draw some general conclusions from the experimental and theoretical work on domain-specific principles. Three features seem to emerge from this literature:

1. Intuitive principles are *domain specific*, and trigger functionally different cognitive processes, depending on the domain. In other words, conceptual development does not imply applying an all-purpose, "theory-making" cognitive device to a variety of available stimuli. On the contrary, it implies applying significantly different cognitive heuristics to different domains. As R. Gelman puts it, "different [domain-specific] sets of principles guide the generation of different

plans of action as well as the assimilation and structuring of experiences" (1990, 80).
2. They seem to develop *spontaneously*, independently of tuition or objective changes in the available information. This is particularly salient in the shifts observed, which are not experience driven. Consider for instance the developmental schedule of the different principles of intuitive physics. This seems under-determined by

5. This is why some philosophers have suggested that commonsense belief-desire psychology may be an altogether erroneous account of mentation. See for instance D. Dennett 1978, P.M. Churchland 1981, and S. Stich 1983. Against this view, Fodor (1987; 1990, 3-29) makes a strong case for the scientific value of commonsense belief-desire prescriptions.

experience, in the sense that everyday experience with solid objects confirms all principles to the same extent. People learn much more than they are taught because a set o£ prior principles delimit the range of stimuli construed as pertinent for a given domain. To quote R. Gelman again, "the initial principles of a domain establish the boundary conditions for the stimuli that are candidates for feeding coherent development in that domain" (1990, 83);
3. Intuitive presumptions are *connected in a complex way to later theoretical development*. In some cases, such as intuitive psychology, adult conceptions seem to flesh out the conceptual skeleton provided by intuitive principles. They provide more material, more refined explanatory schemes, but never seem to go directly against the spontaneous assumptions. In other cases, such as the acquisition of scientific physics, it is necessary for subjects to acquire counterintuitive principles (such as the difference between *force* and *motion*, which even in educated adult subjects is often a domain of uncertainty).

All this points to another plausible conclusion, which is of direct interest to anthropologists: that domain-specific intuitive principles constitute *cross-cultural universals*. This of course should be an unsurprising consequence of the second point, above. If intuitive principles are not induced by the environment, how could they be modified by changes in that environment? Anthropologists, however, are likely to resist the idea of cognitive universals, if only because of the occupational disease of relativism mentioned in chapter 1, so this point must be emphasized. There are a number of reasons to think that intuitive principles are likely to be universal. First and foremost, there is conclusive experimental evidence that they can be found, in the same form, in very different cultural environments. I already mentioned the Avis and Harris experiments on Pygmy subjects. As for biological knowledge, the universality of its basic principles is a familiar point (see Berlin, Breedlove, and Raven 1973; C. Brown 1984; Atran 1990). Furthermore, other aspects of conceptual development appear to be similar, even in domains that could give rise to strong cultural influences. For instance, S. Walker-Jeyifous observed that the defining-to-characteristic shift, as described by Keil in American children, occurs in the same form in Yoruba subjects of the same age. Moreover, the shifts display the same domain-specific characteristics. If anything, more variation can be found within Yoruba subjects, between rural and urban subjects, than between the Yoruba

average and the American results (Walker [Jeyifous] 1986, 1992). Given the enormous differences in sociocultural settings, it would require some quasi-miraculous coincidence for such shifts to occur at the same age in the same way in the cultures compared. Finally, in many situations children seem to hold only some (not all) intuitive principles, though their "experience," if it supports any of these principles, provides them all with equal support.

Obviously, one may retort that there seems to be ample anthropological evidence to the effect that basic ontologies are in fact culturally relative. After all, anthropological monographs are full of statements describing people in some culture as having no notion of causality, or not attributing beliefs to other people, or literally thinking that bulls can become cucumbers, and so on. However, one should not be misled here by the special properties of anthropological writing. Most of the claims in question are based on the confusion discussed in chapter 2, between intuitive expectations and explicit conceptions. On the one hand, propositions extracted from historically specific "collective representations" (that is, ritualized statements, explicit theories, myths, cosmologies, etc.) are considered direct evidence for cognitive processes, an inference that is both implicit and unwarranted. Intuitive principles, on the other hand, are made manifest through carefully controlled experimental procedures, not by inference from the subjects' explicit statements. To return to the

example of intuitive biological principles, an ethnographic study of "collective representations" in modem Western contexts would certainly suggest that the subjects have no essentialist principles. After all, both children and adults produce and enjoy stories based on between-kind transformations or metamorphoses. It takes particularly controlled situations to reveal that such stories are produced and enjoyed precisely because they violate intuitive expectations. To return to anthropological claims for relativity, it would of course be extremely interesting if anthropological data showed that in particular cultural environments people manage to make sense of one another's behavior without a belief-desire psychology, or develop notions of living kinds without essentialist assumptions. Anthropological accounts, however, never provide either reliable evidence of genuinely strange ontologies or a plausible theoretical account of conceptual development based on these strange principles. In the absence of these two kinds of elements, the burden of the proof is, clearly, on the relativist side. The evidence from "collective representations" does not in itself entail exotic ontologies. It is perfectly compatible with another, more economical hypothesis: namely, that

when people develop nonintuitive, culturally transmitted explicit conceptions of some nonobservable domain of reality, they tend to create principles that go against their own intuitive principles. Why this should be so, and in what way this in fact confirms the prevalence of intuitive principles, is what I will now try to explain.

Intuitive Ontologies and Transmission

Let me now provide a more precise account of the connection between counterintuitive assumptions and "natural" conceptual structures. In my view, the various findings and hypotheses summarized in the above section make this task possible, and they suggest a simple account of the type of representations involved in seemingly unnatural conceptual constructions.

The Ghosts: Violation and Confirmation

To return to the example of the Fang ghosts, *bekong* are invisible, intangible, sentient beings. This constitutes an obvious violation of an intuitive principle, following which intentional beings are physical objects. There is a direct link between intentionality and other characteristics of sentient beings on the one hand, and "corporeality" on the other. Given such premises, the special characteristics of *bekong* make them a conceptual oddity, a puzzling invention. This is very much the way they are construed by the Fang, and most statements about what *bekong* are, or what they can do, are typically accompanied by remarks concerning the uncertainty that results from this oddity. *Bekong*, however, are also assumed to have many other properties, among which are psychological processes. Those processes, in striking contrast to the assumptions concerning physicality, are intuitive in the sense that they are just a projection of the assumptions made about people's mental processes.

The assumptions that constitute a violation of intuitive principles are explicit, either in a general form or in their application to a particular situation. The fact that *bekong* cannot be seen or touched (except in extraordinary circumstances) is explicitly represented. On the contrary,

the assumptions concerning the *bekong's* psychological processes are just as transparent as those concerning people's psychology. Another interesting feature, which is important for the transmission of these ideas, is that the counterintuitive claims do not lead to any inferences beyond their immediate consequences. The fact that the *bekong* are invisible, or that they can go through physical obstacles, is of course consistently used in the anecdotes and speculations concerning these entities. From this strange property, however, it seems difficult to infer anything. Although the strange physical properties of the ghosts are emphasized, they are not the starting point of reasonings or speculations about further aspects of the ghosts. By contrast, the psychological assumptions are constantly, though tacitly in most cases, used to provide the basis for nondemonstrative inferences. For instance, if the ghosts' behavior seems erratic or unpredictable, an explanation will be sought using the general principles that are intuitively used in the interpretation of behavior. Most of these reasonings are speculative and use the episodic material as the basis for conjectures about what can be expected from the ghosts.

This description makes it possible to reformulate, in an empirically significant way, the question of the transmission of ontological assumptions. Ethnographic observation shows that the religious representations within a group often have similar features. In the anthropological phraseology, people are said to "share" a certain set of "cultural representations." The problem is that some important aspects of these ideas are simply not transmitted in any observable way. Faced with this question, anthropology often multiplies the *ad hoc* psychological hypotheses. It postulates that some overarching, super-organic "culture," "symbolic system," is transmitted through "socialization," a process that is labeled but never described in clear psychological terms.

In order to go beyond these vague notions, it is necessary to examine more precisely what the evidence is, and what the anthropological hypotheses amount to. First, one must sort the actual observational phenomena from the quasi-metaphysical assumptions that pervade their description in anthropological monographs. As I argued at length elsewhere (Boyer 1987; Boyer 1990, 1-23), what is observed is certainly *not* that people "share" a system of ideas. Strictly speaking, what we know is that their ideas, however diverse in many ways, make it possible for them to assent to certain public statements, to make inferences that often

sound similar, and to have expectations that are partially convergent. We must therefore explain this partial convergence; the question can only be obscured if we approach it in metaphysical terms, in terms of abstract systems being "shared."

Once the evidence is rephrased more precisely, we can turn to the common theoretical assumptions concerning its interpretation. As I said at the end of chapter l, cultural anthropology generally accepts the implicit hypothesis of "exhaustive cultural transmission." That is to say, it is assumed that all the relevant properties of religious representations are culturally transmitted. This general principle, however, is much too vague to be of any scientific interest. It contains two different hypotheses, which should be discussed separately. One is about the *description* of the contents transmitted, while the other focuses on the *explanation* of the transmission process. The descriptive hypothesis stipulates that it is possible to provide a satisfactory description of all the important notions and principles that constitute the religious representations of a certain group, in terms of culturally transmitted notions. In other words, there is a cultural system of religious representations; if we want to describe how people use these ideas, reason about them, produce expectations on their basis, and so on, we need to consider only the cultural material. The explanatory hypothesis, which seems equally obvious and is therefore taken for granted, states that all the important aspects of the transmission processes can be explained in cultural terms. If we want to explain why certain ideas are stable in a certain group, why they are "transmitted" from generation to generation, we need to consider only the social interaction through which they are made manifest.

Let me first rephrase these two hypotheses in cognitive terms. The descriptive hypothesis would say that all the relevant mental processes concerning religious representations can be described in terms of cultural representations. The interpretation of utterances and gestures, the memorization of episodes, the inferences, expectations, and conjectures concerning religious representations can be described in terms of the local system of religious representations. The explanatory hypothesis would state that the relevant causes of cultural acquisition are to be found in social interaction, notably "socialization," in the groups considered. In my view, both hypotheses are empirically false, however liberal our interpretation of the term "relevant" in the above formulations.

On the basis of the Fang example, I have put forward an alternative hypothesis that, beyond this particular case, applies to all repertoires of religious and other cultural representations. It is just not possible to

describe them, and the relevant processes of representation, inference, and so on, without including in our description a large set of assumptions that are not part of that cultural repertoire of ideas. These assumptions consist in intuitive quasi-theoretical presumptions, which are constantly used in the representation, memorization, and inferential usage of religious claims.

The descriptive part of the "exhaustive cultural transmission" hypothesis is therefore wrong. The reason it is taken for granted, in anthropological theory, is that ethnographic descriptions are invariably fragmentary, from a cognitive standpoint. Anthropological studies of religious representations generally give much emphasis to the counterintuitive claims. This of course is a natural consequence oft he fact that these claims are generally explicit, not tacit. Moreover, they are more attention demanding than the tacit assumptions, for the people concerned. Finally, they are more likely to display some cultural variation, which is after all the point of most ethnographic studies. The counterintuitive claims, however, constitute only part of the conceptual representation of religious entities.

It follows from this that the explanatory part of the anthropological hypothesis is also false. The acquisition of religious assumptions is not necessarily a mysterious process, operating on metaphysical entities. It is a result of the inferences people make on fragmented material, on the basis of prior ontological assumptions. The fact that something is a physical object, is a live being, is a sentient being, and so on orients expectations in a precise way and limits the range of relevant generalizations. Because the Fang for instance tacitly identify the *bekong* as beings endowed with belief-desire psychology, they are led to consider certain aspects of the ghosts as objects of possible generalizations and others as accidental. There is therefore no metaphysical mystery at all in the fact that Fang people know much more about the ghosts than is ever transmitted. More generally, there is no mystery in the fact that people's cultural representations are far more restricted than cultural transmission could explain. All subjects are equipped with similar inferential mechanisms, which restrict the range of generalizations they can produce.

Recurrent Violations in Religious Ontologies

Let me now try to show how this type of explanation could be extended further, to provide a research program in the understanding

of religious ontologies. In my view, what the Fang case shows is that some principles of intuitive, domain-specific conceptual structures can play an important role in shaping and constraining people's beliefs about apparently fantastic religious entities. In this case, the principles in question are notably principles dealing with the explanation of behavior in terms of intentions and beliefs. A natural extension of this conclusion would be to assume that other principles of intuitive knowledge may well play a similar part in the construction of religious ontologies.

Other Religious Claims: Recurrent Violations

The simplest way to describe these recurrent themes is perhaps to try to construct a list of these ontological assumptions that are the basis of religious systems and violate intuitive expectations. I do not claim that my list is exhaustive or even precise enough to be of great explanatory power. It should, however, give some indication of the type of explanation this research program can provide.

Let me begin with the most obvious and probably the most common way that religious representations can be counterintuitive. This is the postulation of a class (or classes) of beings whose specific properties make them either very strange physical objects or apparently nonphysical ones. The Fang ancestor-ghosts are of course among such entities. Religious systems are almost invariably based on such assumptions, so much so that the idea of nonphysical beings has often been taken, from Tylor onward, as the very definition of religion. The claims concerning the physical properties of such entities typically focus on their intangibility, invisibility, ubiquity, instantaneous changes of location, and so on.

Another typical violation concerns the fact that many religious entities are given a strange biological destiny. That is to say, the entities either do not die, or were not born, or do not grow, and so on. Typically, ancestors are biologically "blocked" at the age of death, and gods either are ageless or have a characteristic "age" that does not change with time. In other words, they are explicitly characterized as beings whose existence violates expectations about living beings, to do with normal cycles of birth, maturation, reproduction, death, and decay. Such notions are sometimes involved in religious elaborations in a less direct way. This is illustrated by Bloch's comparative study of notions of death and vitality in initiation rites and sacrifice (Bloch 1992; see also Bloch 1986 for a detailed study of a particular case). Bloch shows that in very different

cultural environments the different phases of the rituals are interpreted in strikingly similar terms, such as the rejection of "natural" life-processes (and their cycles of growth and decay) and the absorption of other entities' "vitality."

A third type of violation concerns the strange mental and communicational characteristics of the supernatural personnel. This is obvious in Western Christian conceptions, for instance, which assume that God can detect not only people's actions but also their thoughts and intentions. As is well known, this explicit assumption can generate many cognitive paradoxes. For example, it is difficult to assume the capacity of intention-reading and to understand what goes on in a prayer (since God knows one's intentions). However, the assumption is necessary to the type of intention-based morality that is posited in such cultural environments. Paradoxes can be generated by other common explicit assumptions, such as the idea that the gods can predict future events, as all students of divination know.

A Conjectural Interpretation

Anthropologists, being trained both to detect cultural differences and to focus on the counterintuitive nature of religious claims, tend to provide us with a distorted view of the cognitive processes involved. Against this distortion I will argue that violations of intuitive ontologies are far more limited than we usually assume, and that the amount of intuitive understanding required to acquire religious notions is far greater than anthropological descriptions would suggest.

Let me offer a brief illustration of this idea, as concerns the three main types of violations mentioned above. As I said, many creatures such as spirits or ghosts are explicitly described as having particular physical properties. I tried to show, on the Fang example, that in order to acquire ideas about ancestor-ghosts, one must admit implicit intuitive assumptions about belief-desire psychology. In other cases, the distribution of intuitive and counterintuitive assumptions may be different. The general point, however, is that it would be difficult to acquire and represent ideas about such nonphysical beings except against a background of intuitive theories.

The same arguments can be put forward in the description of particular biological properties or counterintuitive mental and communicational capacities. The beings that are explicitly construed as eternal actually have many properties that are directly transferred from intuitive

presumptions. Greek gods are eternal and feed on the smell of sacrifices; their common representation, however, included many aspects transferred directly from intuitive expectations about, for example, their reasonings or feelings. Such beings typically display, again, a form of belief-desire psychology that seems self-evident because it is directly transferred from commonsense intuitive "theories." An omniscient God is nevertheless submitted to intuitive principles of psychology and produces *modus ponens* inferences or practical syllogisms in much the same self-evident way as ordinary people. In the same way, the notions of "ritual vitality" described by Bloch (see above) are set against a background of intuitive principles concerning the differences between live beings and other types of objects. As Bloch puts it, the "ritual representation is a simple transformation of the material processes of life in plants and animals as well as humans" (Bloch 1992, 4). To rephrase this in the terms used here, the religious representations contain both explicit counterintuitive principles (e.g., that certain rituals can provide a particular, nondecaying form of vitality) and implicit biological principles that constrain them.

What makes these ideas speculative is of course the scarcity of reliable cognitive data on religious representations. However, this speculative account is at least as plausible as the anthropological notion of complete cultural determination. It is plausible in the sense that it is certainly consistent with, though not entailed by, the anthropological and psychological data available. Moreover, it does not generate the difficult problems created by ordinary anthropological accounts. So it should at least be considered as a plausible alternative to those accounts.

Schematization and Religious Ontologies

In the above sections, I tried to stress the anthropological relevance of intuitive domain-specific assumptions. I must now return to the psychological aspects of these hypotheses. The general picture that emerges here is that the representation of religious entities can be analytically divided into two different parts. On the one hand, the entity or agency is typically characterized by the fact that certain intuitive assumptions are violated. On the other hand, anthropological descriptions

generally overlook the wealth of intuitive assumptions that are

spontaneously projected into the domain of religious entities. In the ontological repertoire of a given individual, religious notions therefore combine two types of assumptions. In the following sections, I will examine in more detail the differences between these two types and their consequences for a description of cultural transmission.

Inferential Power and Schematization

There are important differences between our two types of assumptions, in terms of both *representational status and inferential potential.* The assumptions that constitute a violation of intuitive ontologies are generally explicit, and in any case accessible. That they are explicit does not mean that they are *explicitly described as violations.* As I said in chapter 2, one must remember that "unnaturalness" is an intuitive property. Most Fang perceive the extraordinary nature of flying witches and invisible ghosts, though they may have some difficulty in expressing exactly what is extraordinary in such notions. This is because the unnaturalness of certain claims is a result of a violation of intuitive principles. Contrary to the counterintuitive claims, the intuitive assumptions are not always accessible. To take the example of physics again, very few people are aware of the complex notion of "impetus" which they use to predict the motion of solid objects. In the same way, people make inductive generalizations about some features of animals species, not others; they mostly do this on the basis of principles of intuitive biology which remain partly unconscious.

Another important difference lies in the inferential potential of the assumptions. As I pointed out in the description of the Fang example, there is a striking contrast between intuitive and counterintuitive assumptions in this respect. On one hand, from the counterintuitive, explicit ideas concerning the physical properties of the ghosts, it seems difficult to infer anything. On the other hand, their mental processes, which are understood on the basis of intuitive psychology, are the object of many inferences and hypotheses. Beyond this, a more general point can be made, concerning the way religious assumptions support inferences. The violations of intuitive ontologies do not seem to have much potential, in terms of inferences and conjectures. From the fact that an entity is physical but invisible, nothing much can be derived; that is, except that in a series of situations where it would be necessary to see them, this will be impossible. The same applies to other counterintuitive

claims. The fact that the ancestors or gods are not subjected to the biological cycles of growth, death, and decay is of course the subject of fantasies but does not by itself lead to other inferences or expectations.6 On the other hand, the intuitive assumptions that are used in all religious representations provide the main substance of inferences and conjectures. From the tacit assumption that the gods have a belief-desire psychology, it is possible to produce indefinitely many nondemonstrative inferences about what they know, what they want, how intentions can be formed from belief, and so on. It also makes it possible to produce conjectures about their likely behavior under certain circumstances. In more general terms, this difference between types of assumptions can be described in terms of schematization. Religious concepts seem to combine certain schematic assumptions provided by intuitive ontologies, with nonschematic ones provided by explicit cultural transmission.

Recurrence and Locally Optimal Combinations

In slightly metaphorical terms, one could describe the interaction of violations and confirmations as a kind of division of labor. Religious concepts could not be acquired, and more radically could simply not be represented, if their ontological assumptions did not confirm an important background of intuitive principles. At the same time, they would not be the object of any attention if they did not contain some principles that are simply ruled out by intuitive expectations. One can therefore assume that certain combinations of intuitive and counterintuitive claims constitute a cognitive optimum, in which a concept is both learnable and nonnatural.

For the sake of intuitive clarity, this model could be expressed in metaphorically teleological terms, as follows. In order to create religious representations that have some chance of cultural survival, that is, of being acquired, memorized, transmitted, one must strike a balance between the requirements of imagination (attention-demanding potential) and

learnability (inferential potential). If a religious concept comprises only counterintuitive claims, it will fail on the second criterion. Take the imaginary example of a god that would be construed as omnipotent but having no mind, so that you cannot have any description

6. Obviously, there are examples in some literate cultures of theological speculations, the aim of which is precisely to speculate on such matters. However theoretically enriched in literate models, counterintuitive claims still have very little inferential potential.

of his/her/its mental processes. This would make it virtually impossible to make sense of the relationship between the god and human action7 Conversely, a concept that confirms only intuitive ontologies is, *ipso facto*, nonreligious and has little attention-demanding power. One of the optimal ways of striking the balance is to take all intuitive ontologies as confirmed, except a few assumptions that are then explicitly described as violated in the case of the religious entity.

Of course, all this is teleological fiction. To put things in a nonintentional way: in any cultural environment, indefinitely many representations of religious entities are constantly created and communicated. Only some of them, however, have the potential to support both imaginative scenarios and intuitive inferences. These are the ones that combine a rich intuitive base, with all its inferential potential, and a limited series of violations of intuitive theories, which are attention-demanding. Because of these characteristics, such assumptions are more likely than others to be easily acquired, memorized, and transmitted than other assumptions. It should not be surprising, therefore, that they constitute the most recurrent aspects of religious systems. Again, they are certainly not universal, but they are more frequent than other types of religious representations, and my account, based on the notion of intuitive assumptions combined with explicit circumscribed violations, would account for this statistical phenomenon in an economical way.

This hypothesis receives indirect support from another domain of apparently unconstrained speculative thinking, namely the range of metamorphoses depicted in folk stories and in literary works inspired from such traditional material. In a survey of such texts, M. Kelly and F. C. Keil (1985) showed that metamorphoses are far more frequent within than across the broad ontological categories that constitute the "ontological tree." This can be interpreted as a consequence of the double requirement formulated above. A metamorphosis between two different ontological categories requires suspending the causal expectations that accompany both ontological domains. As a result, the range of inferences that can be entertained about the object concerned is not restricted enough to make the imaginary entity the object of precise

7. In some situations, literate theologies do construct such notions. This is the case for Buddhism for instance, which pushes to the extreme a nonmentalistic understanding of metaphysical agencies. It is quite interesting to observe that, in such cases, the representations actually held by nonspecialists (what is sometimes called the "popular religion") actually supplement the framework with more intuitive principles, e.g., to the effect that the Buddha has many attributes of a person.

scenarios. This illustrates a more general point made by Atran, on the basis of the connection between folk biology and animal "symbolism": "only to the degree that... impossible worlds remain bridged to the everyday world can information about them be stored and evoked in plausible grades" (Atran 1990, 220). I would go further, and contend that the "impossible worlds" or entities of religious symbolism are not only linked (or "bridged") to intuitive beliefs; they are in fact pervaded by those intuitive beliefs, which allow coherent expectations about the religious entities and processes.

Conclusion: The Naturalness of Unnatural Claims

To sum up, the argument of this chapter proceeded in four steps, each of them taking us further from the classical anthropological account of religious ontologies:

1. Developmental studies show that ontological categorization can be spontaneously produced by nondemonstrative inferences, on the basis of a fragmented input. In other words, ontological assumptions need not be transmitted in order to be represented. To take a simple example, there is no need to transmit the assumption that tigers are live objects and

therefore share with live giraffes important properties, which are not shared with plastic tigers.

2. Ontological assumptions carry important quasi-theoretical information. Ontological categories correspond to domain-specific principles, which structure intuitive expectations concerning the objects concerned, as well as the inferences that can be made about them. Classifying something as a living being implies having very strong presumptions about the way it appears and will disappear, the kind of behavior that can be expected from the object, and the way one can learn about the class by observing particular exemplars.

3. Assumptions that violate intuitive theories are systematically coupled with assumptions that confirm them. It is of course possible for human minds to speculate about entities that are entirely freed from the constraints of intuitive ontologies. Such notions, however, are not usually found in religious ontologies. In most cases, religious entities in fact confirm many intuitive principles. Their

characteristics and behavior are in part construed on the basis of those confirmed principles.

4. Even assumptions violating intuitive principles are themselves constrained by those principles, in the sense that not all combinations of violated and confirmed assumptions are equally easy to conceptualize. Some combinations are easier because they require only a suspension of limited expectations, while a number of tacit expectations are confirmed.

These four points are crucial for the psychological study of religious ontologies. Since this domain has been almost entirely neglected in anthropological theory, we cannot offer here more than plausible suggestions and hypotheses for further empirical investigation. The feature that makes religious representations particularly interesting, and in fact constitutes the category of "religious representations," is a striking divergence from everyday understandings. I am claiming here, however, that this feature is not the most relevant one, in a causal explanation of the recurrence of religious representations. What seems to be the very "essence" of religion, its departure from common sense, is only part of the elements we must include in an account of its transmission. This conclusion may seem paradoxical; it is so, however, only if we want to maintain a congruence between humanistic interests and scientific explanations. Religious ontologies constitute a fascinating domain, for anthropologists as well as practitioners, because they put forth extraordinary claims. They are learnable and communicable because their mental representation includes, and is constrained by, assumptions that are part of a universal intuitive understanding of basic ontological categories.

5
Causal Judgments

Causal judgments highlight salient differences between human groups. In any particular cultural environment, natural and social events are causally interpreted in ways that would make no sense or would be only of minimal plausibility in other groups. To return to an example discussed in the previous chapters, it is accepted as plausible, among the Fang, that some cases of illness are caused by witches flying about on banana leaves and throwing poisoned darts at their victims. In this chapter I will try to examine the cognitive processes whereby subjects are led to find a certain repertoire of causal judgments intuitively plausible. Before considering the theoretical problems involved, I must emphasize two simple points, which must be kept in mind in the following discussion. First, as I said in chapters 2 and 4, such Fang causal judgments are considered attention demanding by virtue of their intuitive unnaturalness; to say that some Fang people entertain them as plausible does not imply that their counterintuitive nature is not recognized. Second, such judgments would seem bizarre, not only to Western outsiders, but also to Chinese or Amazonian or Melanesian observers; the temptation to formulate discussions of causation in terms of "us-them" (or "the West-the rest") oppositions must be resisted.

In its examination of the causal "repertoire," cultural anthropology has mainly focused on "magical" connections. Consequently, the question of causal thinking was construed as a question about the *rationality* of those beliefs. Such

discussions are by and large irrelevant to the

problems considered here, being invariably couched in epistemic rather than cognitive terms. In spite of this difference of approach, I will begin my examination of causal assumptions by focusing on two claims that originated in the rationality debate and constitute complementary explanations for cultural differences in causal judgments. The first claim is that such observed differences are the outcome of underlying differences in the *principles of causation* used, in other words in the very notion of cause. The second claim is that causal judgments are the deductive outcome of different cultural "theories" or "worldviews," of which they constitute theoretical principles.

Causal Judgments and Principles of Causation

Ever since "magic" became a central anthropological topic, many claims have been made about culturally specific "conceptions of causality." The idea that exotic rituals or beliefs imply a special "conception of causality," or that they do not fit in the "Western conception of causality" is certainly pervasive in the anthropological literature, although the theoretical underpinnings of the distinction between different "conceptions of causation" are not really discussed. These hypotheses range from the wildly implausible to the intuitively obvious. An extreme case of the former is D. D. Lee's claim that Tro-briand islanders have simply no notion of causality at all, so that they cannot even grasp the idea of an event being the cause of another event (Lee 1949).1 There are, however, more serious arguments based on the idea that different "cultures" may use different concepts of causation. In the following pages I will discuss R. Needham's explicit defense of this idea. Although Needham makes a particularly lucid case for the hypothesis, we will see that it raises a number of theoretical difficulties. I will then proceed to a more directly psychological argument, put forward by Hallpike, before presenting a more general version of the claim.

1. This of course is an extreme, and therefore comic version of the claim. It is rather difficult to imagine what life would be like among people who have no notion of cause. Dropping logs on their feet, feeling a sharp pain . . . they would see no connection between the events. To surmise what hunting, agriculture, or social relations would be like in such a world is probably better left to some form of cognitive science-fiction.

Culturally Specific Principles: Needham and Hallpike

Needham's article "Skulls and Causality" (1976) focuses on a prototypical case of magical connection and draws some conclusions from its systematic distortion in the ethnographic literature. Among Borneo headhunters, enemies' skulls are considered a precious possession. They are supposed to bring prosperity and luck to the lineage that holds them. In the ethnographic descriptions reviewed by Needham, people were reported to believe that the skulls contained some "mystical power" or "energy" that brought about the desired effects. Against this, Needham tries to show that there is no real evidence that the people concerned have such a concept of mystical "force" or "energy"; the notion is a mere ethnographical artifact. What is posited by the informants is a direct connection:

possession of skulls → well-being

Having the skulls brings about the desired effects, and that's that. To the anthropologists, however, the idea of such a direct connection seemed so odd that they found it legitimate to "fill in" what appeared to be a "gap" in the informants' reasoning. They consequently posited an abstract notion of "vital power" or "energy" as an intermediate term, between having the skulls and benefiting from them:

possession of skulls [→ mystical energy] → well-being

According to Needham, the origin of this distortion of the ethnographic data lies in the discrepancy between the anthropologists' and the natives' conceptions of causality. In assuming that the natives had a concept of "invisible fluid" or "invisible energy," anthropologists may well have believed that they were describing a typically traditional, non-

Western worldview, where "mystical" forces are endowed with causal efficiency. As Needham points out, however, this idea of invisible fluids and energies is, if anything, typically modem and Western. Everyday life in a modem society is full of events that must be explained in that way. Pressing a switch causes a light bulb to diffuse light, because an invisible "fluid" is allowed to flow through wires. Passing through invisible infrared beams makes automatic doors slide open, and so on. This, Needham argues, is what makes it difficult for Westerners to understand the idea that skulls can have direct effects on people who own them, without the intervention of any intermediary entity or agency.

Needham suggests that conceptions of causality are culturally specific. The idea of intermediary "fluids" is thus described as intrinsically Western and modem, while some conception of "direct causation" is supposed to be at work in head-hunting tribes. Needham's argument is of course only one among the many formulations of an assumption that pervades anthropological discussions of "magic," namely that different people hold true different causal judgments because they have different notions of cause or different "principles of causation." In a classical formulation, "primitive" societies as a whole were credited with a special mode of thought, with its specific notion of causation, founded on resemblance and participation rather than mechanical processes. Such ideas, however, were never founded on a precise description of the psychological mechanisms hypothesized. An exception is the chapter devoted to notions of causation in Hallpike's general essay on the psychology of "primitive thought" (1979). In this domain as in others, Hallpike finds the "collective representations" reported by anthropologists very similar to the thoughts of children as described by Piaget. The seemingly strange causal connections admitted in magical thinking are compared with the child's causal thinking at what Piaget calls the "pre-operatory stage." Hallpike stresses a few features that make the parallel relevant. For instance, "primitives" are said to have animistic beliefs, to endow inanimate objects with intentionality; also, they are said to believe in the power of words, for example, in magical incantations that are supposed to bring about a desired state of affairs simply by describing it; they hold certain causal connections true without bothering to inquire by what intermediary mechanisms they could work (see Needham above); they project in an object aspects of its relation to the person who handles it; they think that all features of an object (e.g., its shape and color) can enter into causal connections. As we will see below, these alleged features of "magical" thought are also what Piaget described as typical or early stages of conceptual development. For Hallpike, the "primitive notions of causation," like those of pre-operatory children, are "absolutist, phenomenalist, psychologistic, irreversible and static, lacking a real grasp of process" (1979, 451).

Neither the anthropological evidence nor the psychological framework, however, seem to support Hallpike's strong conclusions about the features of "primitive causation." In chapter 2, I mentioned the serious reservations one should make about the way anthropological reports are treated as direct evidence of psychological data, as well as the conceptual problems created by the general notion of primitivism. This applies to

ideas of causation in the same way as to other aspects of "collective representations." The Piagetian framework will be discussed in detail below and shown to be insufficient as a description of the child's causal thinking. Hallpike's parallel seems therefore groundless, analyzing misconstrued cultural data in the framework of an unsatisfactory description of children's thought.

Modes Of Thought Or. Contexts?

Needham's and Hallpike's explanations have the same problematic consequences. Let me mention only one that is generally felt by most ethnographers and is often mentioned in general discussions of "modes of thought." People do not plow their fields, or compute what remains due of a bridewealth payment, in terms of "participation" and "resemblance." To such matters, they apply rather pedestrian notions of cause and effect, which have none of the unconstrained or childlike aspects described in primitivist models. People who state that reciting a certain spell can bring about someone's death nevertheless stick to rather "normal" ideas of causation as concerns trivial everyday events, like stones breaking windows or kicks inducing pain. This is why most anthropologists assume that admitting "strange" causal judgments is a question of *context* rather than *mentality*. People engaged in magic or other such activities are supposed to "suspend" the constraints of the commonsense everyday conception of causality. They therefore accept as valid some causal judgments

that violate well entrenched principles of causality, such as the necessary contiguity of cause and effect. This anthropological idea can be found in many different forms. Here I will not expand on these different models, but argue that the division itself between everyday "principles of causation" on the one hand, and magical principles on the other, makes little sense. This is because the very notion of "principles of causation" is inadequate in general.

Problems with the "Principles

of Causation" Approach

The main question involved here is that of the relationship between *principles of causality and singular causal judgments*. A conception of causality is a set of abstract principles specifying, for example,

what types of entities causes and effects are, what can and what cannot count as a cause, whether causes always precede their effects, and so on. Singular causal judgments concern only particular occurrences; they are of the form "A caused B" or "A caused B because of C"; for example, "it's because the stone hit the window that the glass was broken" or "we are well-off here because we collect enemies' skulls." When anthropologists try to explain "strange" causal inferences by positing culturally or contextually specific "conceptions of cause," they assume that such abstract conceptions are involved in the selection of causal judgments. Whether a subject finds a certain causal interpretation valid or not depends on the conception of causation he or she is applying to the events or states of affairs concerned.

At first sight, this idea of causal thinking seems almost truistic. After all, singular causal judgments are indefinitely diverse, and the idea of some state of affairs bringing about some other state of affairs is common to all of them. So it seems reasonable to suppose that some general underlying principles must be repeatedly applied to a manifold of events. A stone is seen to hit a window, the glass is seen to break. Given some abstract rules about, for example, the necessary contiguity of cause and effect and the precedence of causes, the course of events is subsequently interpreted as "the impact of the stone breaking the window." To be more precise, a series of *formal* principles impose constraints on the range of event pairs that can be construed as causal. The principles do not in-dude information concerning the types of objects or processes involved. They only contain information about the form of their connection.

However seemingly obvious, this conception of causal thinking poses major problems. First, even if different "principles of causation" were necessary to account for differences in causal judgments, they would not be sufficient. Second, even if they were sufficient, they would be extremely difficult to specify, even in ordinary, nonmagical types of causal judgments; they would have to be so vague that even prototypical cases of "magical" connection would be compatible with them. Finally, the notion of noncausal descriptions of events, which constitute the input to causal descriptions, is conceptually incoherent.

Difficulties In The Specification Of "Principles Of Causation"

Let me first consider the question of vagueness and generality in the "principles of causation." As has been pointed out many

times, the apparently simple notion of "cause" in fact encompasses many different types of relationships. In certain contexts, what can be described as a "cause" is a necessary condition, in others a sufficient condition, or a relevant explanation, or a statistical regularity, and so on.2 Even if we decide that the term "cause" is polysemous, and that certain senses can be separated from the core concept Of CAUSE, we will be left with a variety of different interpretations of what the cause of an event is.

An illustration of these problems is given by H. L. A. Hart and T. Honore's thorough study of causation in legal matters (1959). The causal judgments judged relevant by tribunals in apportioning responsibility constitute a very limited domain of causal reasoning. They are a limiting case, in the sense that the reasonings leading to a legal derision must be documented to an extent unparalled in ordinary or even scientific reasoning. Furthermore, all the inferential steps, from

evidence to conclusion, must conform to certain abstract inferential schemes. Given such constraints of consistency and explicitness, one may expect the legal concept of CAUSE. to be much more consistent than the everyday concept. This, however, is not really the case. In spite of the constraints, the legal notion of cause encompasses many different, sometimes incompatible, construals of what causes are: necessary, sufficient, necessary and sufficient, relevant conditions, and so on. The implicit "conceptions of causation," if one must use this term, which are held by the legal system are too diverse to be amenable to any unified abstract description. Obviously, if true this should apply *a fortiori* to causal claims made in contexts in which the requirements of consistency and explicitness are much less constraining.

These data point to one crucial flaw of all models based on some notion of "principles of causation." As I pointed out above, such models are generally based on some opposition between a supposedly everyday (or "rational," "commonsense") notion of causation and a less constrained magical notion. Advocates of such models, however, are often rather laconic as concerns the crucial question of what this everyday (or "rational," etc.) notion actually consists of. This of course is rather surprising, since it seems difficult to understand an opposition without a clear view of what is being opposed to what. The omission is not only

2. See B. Berofsky 1971, 58ff., J. L. Mackie 1974, 34ff., and B. Skyrms 1984, 245 for a survey of the types of relationships that can be taken as causal. Accounts of causation are judged here on their psychological, not metaphysical, merits; that is, as accounts of how people think about causes, not as accounts of what causes are.

surprising, it is also damaging, because the authors in question generally take for granted that the everyday (commonsense, etc.) notion of causation is based on precise, constraining formal principles. But philosophers, even in strictly formalized areas of discourse, fail to uncover such formal principles. What they highlight is the diversity of causal notions, as well as their embedding in empirical knowledge. So one of the terms of the opposition seems to vanish. The only "principles" that can be said to be implied in most cases of causal judgments are very vague generalizations, for example, to the effect that causes usually precede effects, and that causes must have some link with their effects. None of these vague principles, however, would be sufficient to rule out the "magical" connections reported by anthropologists.3

The putative (culturally or contextually specific) "principles of causation" are always much too powerful. They allow many inferences that are never actually observed. To take but one example, Needham's idea of "direct" causation is supposed to explain how people can associate skulls and prosperity. Obviously, having a notion that distant objects and states of affairs are nevertheless "directly" connected by causal links would allow people to establish causal connections between indefinitely many objects and states of affairs: skulls and unhappiness, skulls and rainfall, skulls and bad crops, and so on. But such causal connections are not observed. Therefore, some representations other than the abstract "principles of causality" are involved. "Suspending," for example, the requirement that cause and effect must be contiguous certainly allows one to accept magical accounts. But it also makes it possible to generate indefinitely many other accounts, which people never make.4

3. Some authors oppose magic to *scientific* notion of causation. Again, however, this is conceptually confused. Some proponents of this view seem to believe that "scientific" modes of thought are pervasive in Western everyday thinking, an assumption that is less than altogether plausible. Even leaving aside this extravagant claim, the idea of a "scientific notion of causation" encounters the same problems as that of a "Western" notion. The "scientific" notion in question may be construed as referring either to the scientists' mental representations or to some abstract notion that is embodied in scientific theories. In either case, however, it is particularly difficult to specify the "principles of causation" accepted in Western science: see R. Miller 1987 and Skyrms 1984, among many others, on the polysemy of "cause" in scientific explanations. The only stable "principles" are vague, unconstraining generalizations that do not rule out magical connections. Substituting "scientific" for "Western," in descriptions of "principles of causation," therefore makes little difference.

4. The insufficiency of principles-based accounts is seldom noticed by the anthropologists who put them forward. This is probably because they work, more or less explicitly, in a framework inherited from the famous "rationality debate." That debate was concerned exclusively with questions of apparent irrationality, and the hypotheses often

(Footnote continued on next page)

Are Noncausal Event Descriptions Possible?

The principle-based approach runs into another difficult problem, as concerns the description of simple events. The account implies that abstract principles are brought to bear on noncausal descriptions of events. It is rather difficult, however, to imagine what such noncausal descriptions could be like. Any description of singular events is bound to include many implicitly causal terms, notably dispositional terms, which cannot be reduced to simpler, noncausal versions. Even the description of "a stone hitting a window" contains such terms. The property BRITTLENESS is part and parcel of the ordinary concept GLASS. Now BRITTLENESS, being a dispositional concept, is therefore implicitly causal. It refers to what happens if glass is handled in certain ways, as a *consequence* of the handling. Event descriptions always include such implicitly causal terms. One may think that a solution to this problem would be to describe the events in question at a very low level of abstraction, as conjunctions of sensory properties and changes in those properties, in order to avoid such theory-laden concepts as BRITTLENESS. This will not do, however, because such low-level descriptions would make it impossible to recognize events as, precisely, events. Conjunctions of sensory properties do not constitute events or states of affairs unless they are held together by some conceptual elements, which inevitably include causal components.5 In other words, it is likely that causal elements are relevant to the very constitution of singular events, rather than events being used as the raw material of causal generalizations.

A "Decentralized" Alternative

These difficulties are all very familiar to philosophers engaged in the conceptual analysis of the notion of CAUSE. There are

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suggested that, once the apparent h-rationality is removed or explained, we have an explanation of why people hold the beliefs.

5. It is impossible to represent what happens when a brick hits a window without a concept of HITTING. It is not possible to give a characterization of HITING in terms of sensory properties (and conjunctions thereof) without including many events that are not cases of hitting and excluding many which are. The only way of avoiding this problem is to include conceptual, and notably causal, elements in the analysis of HITTING.

several ways of avoiding this kind of problem. One is to assume that the concept of cause is represented in a prototypical way. In this account, singular causal connections are judged on the basis of their resemblance to certain core cases, like the intuitive link between contiguous physical events. The concept of cause specifies the conditions that obtain in such core cases as its "default values." It is therefore not constraining, in the sense that its application to nontypical situations is more and more hypothetical as they diverge from the central prototype (Lakoff 1987, 54ff.; Miller 1987, 121ff.). Another, not necessarily incompatible solution is to abandon the very notion of "principles of causation," at least in the constraining sense used here. The notion of general principles of causation, however intuitively self-evident, is by no means the only conceivable account of causal thinking. It is perfectly conceivable that causal judgments in different domains, even if they share certain logical properties, are mostly based on different principles. In other words, whatever "causal principles" are operative in causal judgments might be *decentralized* principles, which only apply to certain types of connections. In this view, singular causal judgments would combine a psychologically primitive and unconstraining notion of "bringing about" with various constraining empirical principles.6 Some of these principles would extend to whole ontological domains, for example, specifying special conditions for causation in ANIMATE BEINGS as opposed to INANIMATE OBJECTS. Other such empirical generalizations would be more specific and concern specific kinds of natural objects or types of artifacts, for example, FLUIDS as opposed to SOLID OBJECTS. In such a view, the very notion of "principles of causation" is dissolved; whatever principles make causal judgments plausible are part and parcel of empirical knowledge.

So far, we have dealt with these problems only from the viewpoint of conceptual analysis, that is, of a philosophical description of the conditions under which the concept CAUSE could be described in a coherent way. In order to go further, notably to adjudicate between "centralized" and "decentralized" accounts of causal thinking, we must consider

the problem from a psychological angle, and examine the actual cognitive processes whereby subjects represent causal connections and acquire the conceptual means to represent them.

6. On the hypothesis that CAUSE. is an unanalyzable primitive, see Boyd 1980 for an explicit defence of the argument and Putnam 1983, 214 for a discussion.

Aspects of the Development of Causal Thinking

In this examination of the psychological aspects of causal thinking, I will mainly consider developmental data. This is because the questions concerning the abstract "principles of causation" can be best illuminated by examining the ways in which causal judgments and causal frameworks are gradually acquired by children. Also, one of the sources for the very idea of abstract "principles of causation" as a cognitive mechanism is found in the developmental literature, particularly in the works of Piaget and his colleagues.

Piaget and The Notion Of Structural Principles

A constructivist developmental account of causal thinking was put forth by Piaget and his collaborators in several works (Piaget 1930, 1954, 1974; Laurendau and Pinard 1962). As some central tenets of the Piagetian developmental framework were described in chapter 4, I will mention only their consequences for the description of causal thinking. The preschooler's worldview, according to Piaget, can be described as "non-causal," in the sense that most of the adult constraints on causal connections are absent. The child is described as gradually shifting from an "animistic" notion of causality to a more differentiated conception, in which intentional and mechanistic causation are adequately distinguished. Even children at this stage of "concrete operations," however, tend to invoke intentional causation in the explanation of physical phenomena. It is only with the formal operational stage, at about eleven to twelve years old, that the child develops a full understanding of causal connections.

This picture of causal reasoning is mostly based on interviews in which the child is asked to provide an explanation for a variety of physical and intentional phenomena. In the context of such interviews, children typically give "animistic" explanations, even for natural phenomena. Four year olds for instance generally use an intentional vocabulary to account for the course of the clouds in the sky: the clouds "want to go" somewhere or "want to stay put," and so on. Eight year olds, however, tend to prefer some mechanistic "push-pull" type of explanation (Lau-

rendau and Pinard 1962). More subtle effects of the animistic principle can be seen in other domains. Six year olds for instance seem generally unaware of the purely physical nature of shadows and appear to construe them as things "emanating" from objects and persons. The subjects state that shadows are things "made" by people and objects; they also maintain that people "make" shadows even at night, although it is too dark to see them (Piaget 1930, 187). Also, the six year old is described as having no notion of reversible physical processes, because his or her notion of causation is projected from the domain of intentional causation, in which intentions cause actions, not the other way round (Piaget 1930, 271). To sum up, the child proceeds from an egocentric perspective to a generalized intentional description of cause-effect relations ("animism"), and from that to an awareness of mechanistic, reversible cause-effect connections (Laurendau and Pinard 1962).

There are some ambiguities in this account. The theoretical concepts, notably the notion of structural principles of causal thinking, are not precise enough to avoid the type of ambiguities described above. More importantly, the empirical data may be compatible with a more economical description of cognitive development. It may be of help here to distinguish, after M. Bullock, R. Gelman, and R. Baillargeon (1982, 211), three different elements that contribute to the child's causal judgments, namely *principles of causation*, *perceptual cues*, and *empirical knowledge*. We must not confuse the principles "underlying the definition of cause and effect," the cues used by subjects to recognize causal situations (which Bullock et al. call "stimulus information"), and the contribution of general knowledge about the objects or processes involved. In the next sections I will use these distinctions to highlight two central ambiguities in the Piagetian framework.

First, in postulating abstract structural principles, Piaget's account may underestimate the possible contribution of perceptual information to the building of causal thinking. Second, it is not clear whether the experiments really tested children's principles of causation or only some general principles of their empirical knowledge of the world. Once these ambiguities are cleared up, it is possible to understand how decentralized, domain-specific causal assumptions can be developed by the child.

First Problem: Abstract Principles Or Perceptual Cues?

In the Piagetian account, the fact that the child interprets a certain connection as causal is described as the application of abstract

criteria concerning what causes and effects are. This, however, is not the only possibility. In many cases, the causal interpretation of a succession of events may be strongly influenced by perceptual cues. Indeed, experimental research tends to show that these perceptual cues are crucial even at the earliest stages of causal thinking. In order to understand how perceptual cues can affect causal judgments, it may be of help to recall A. E. Michotte's famous experiments on adults (1963). The subjects were shown dots moving on a screen, along different, sometimes intersecting trajectories. Some combinations of trajectories give the subjects a strong "intuition" of causal connection; that is, they "feel" that the movement of one dot has "caused" the other to move, even if they are aware of the fact that what they see are just prepared displays with no real physical interaction. Michotte also showed that this "causal intuition" can be eliminated by very minor changes in the spatio-tem-poral configurations, for example, by introducing a delay between action and reaction, even as short as a few tenths of a second. In other words, what sorts out causal connections from other combinations of events seems to be a series of precise conditions about the relative timing and contiguity of the events. Because the stimuli are entirely artificial, and because the subjects are aware of their artificial nature, this effect cannot be ascribed to empirical knowledge. It stems from perceptual predispositions, which automatically single out causal sequences. As A. Leslie puts it (1982, 185), "in stark contrast to the Piagetian view are the arguments of Michotte that perception of causality is *direct* and *immediary*, implying no specific basis in action... all that is required on this account is the ability to detect certain formal properties of stimulation which 'specify' a causal concept."

In a series of dishabituation experiments with infants, Leslie (1979, 1982) tried to evaluate the importance of such intuitive effects on early perceptions of physical events. The studies show that infants from four and a half months can indeed single out the specific spatio-temporal conditions that lead adults to interpret certain events as "causal." In another series of experiments, Leslie and S. Keeble (1987) tried to determine whether twenty-seven-week-old infants could distinguish between causal and noncausal versions of such events. The experimental setup included films of simple causal events, and their reversal, which show that even at that age, events with a causal structure can be discriminated from events that have the same components and surface properties but no causal links. Leslie and Keeble postulate "a visual mechanism, already operating at 27 weeks, which is responsible for

organising a causal percept" (1987, 283). "Instead of causality being entirely a result of the gradual development of thought... an important and perhaps crucial contribution is made by the operation of a fairly low-level perceptual mechanism" (1987, 285).

Obviously, empirical knowledge can partially override the intuitive effects. Michotte's subjects could "decide" that the causal interpretation was just an illusion. The important point, however, is that there is such a strong, stable intuition to override. Such intuitions, which single out certain types of event sequences, may well constitute a perceptual anchoring on which later notions of causal processes are based. Furthermore, the perceptual distinctions might be even more refined than in Leslie's experiments, and form the basis of ontological distinctions. As I indicated in chapter 4, there is some evidence that a distinction between self-generated and non-self-generated movement is made by infants (Massey and R. Gelman 1988). In a conjectural paper on causal perception in infants, D. Premack (1990) speculates that this distinction may constitute the basis of a conceptual distinction between physical and intentional types of causal connection. As Premack puts it, "motion *per se* is not the critical parameter... change is what is critical, in velocity or direction ....

Induced changes in movement in non-self-propelled objects [are] what the infant perceives as physical causation .... Changes in the movement of self-propelled objects are what, I suggest, the infant perceives as intentional" (1990, 3). Premack's hypothesis is that this perception-based distinction constitutes a skeleton, which is then conceptually enriched and partly modified as an ANIMATE/INANIMATE distinction.

Second Problem: Abstract Principles Or Empirical Knowledge?

It is difficult to sort out, in Piaget's results, the elements that reflect the child's "principles of causation" from those pertaining to empirical knowledge. M. Laurendau and A. Pinard's studies (1962) are typical of this ambiguity. That four year olds and eight year olds produce different explanations, intentional and mechanistic respectively, for the movements of clouds, is described as a change in the "principles of causation" children resort to. However, this could be explained equally well by the tremendous increase in empirical knowledge that takes place between the ages of four and eight. In this case, the child would not have acquired more complex notions of causation, but more

complex notions of clouds (and other such phenomena). This possibility becomes all the more relevant, if one remembers that Piaget's questions often focus on topics with which four year olds are simply not familiar.7 This probably leads the child to treat the problems by analogy. In Piaget's own experiments, however, it is particularly difficult to evaluate the influence of empirical knowledge, since this factor is not explicitly differentiated as an independent variable. Piaget for instance tends to score as "non-causal" the child's explanations, if they are causal but empirically wrong (Bullock et al. 1982, 219). Also, this confusion of "principles" with empirical generalizations sometimes leads Piaget to seemingly contradictory descriptions. For instance, he states that six year olds cannot conceptualize reversible causal processes. Yet he accepts that children who are familiar with bicycles are familiar with at least one reversible process; pedals can rotate wheels and wheels can rotate pedals. In spite of such obvious disconfirming evidence, he reaffirms that the child's "views about the origin of things" are "still entirely mythological" (1930, 233).

This assimilation of abstract principles and empirical knowledge is of course a consequence of the genetic framework. If the child is assumed to be applying abstract principles across conceptual domains, then these structural principles and the generalizations of empirical knowledge are presumed to be one and the same thing. The experimental evidence changes dramatically, however, if one tries to separate them systematically. This was one of the main points of Bullock, Gelman, and Baillargeon's experiments. They start with a rough description of the com-monsense notion of CAUSE, in terms of three abstract principles: *determinism*, following which no event can happen without a cause; *priority*, which states that causes precede effects; and *mechanism*, *the* assumption that there must be a "transfer of causal impetus," direct or indirect, between cause and effect (Bullock et al. 1982, 211). In all experiments concerning physical objects and simple mechanical processes, the children's explanations are invariably consistent with those three principles. In other words, the "principle" of mechanical causation, if there is such a thing, cannot be acquired at the stage of "con-

7. Many psychologists have criticized the use of children's statements in domains with which they are not familiar, saying that the children therefore put forward speculative interpretations rather than express straightforward beliefs. See for instance U. Goswami and A. L. Brown (1989), who show that contrary to Piaget's predictions, three year olds can solve analogical problems (of the form a: b :: c: ?) if the terms of the problems are familiar and focus on causal processes.

crete operations," since the child had it long before. As Bullock and the others conclude, "the development of causal understanding is more a process of learning where, when and how to apply the rules of [causal] reasoning rather than figuring out what these rules might be" (1982, 216).

General Remarks

The Piagetian framework constitutes the only precise formulation of the idea that causal thinking is directed by abstract structural principles. As we have seen, however, the data seem to support an alternative account. In the domain of physical objects and simple events such as changes of trajectories or changes in velocity, conceptual interpretations can

be partly based on perceptual cues. Later developments are not complexifications of abstract "principles of causation," which are never really necessary. On the contrary, the development of causal reasoning is part and parcel of the development of empirical knowledge. The only principles the child needs, in order to develop an awareness of causal processes, are empirical generalizations. This type of developmental story is congruent with the research on domain-specific principles mentioned in chapter 4. The child's conceptual development can be conceived as the gradual enrichment of a skeleton of basic ontological distinctions, rather than a series of radical changes in structural principles. Obviously, such enrichment can lead to important shifts in some domains. These shifts, however, are driven by the complexification of domain-specific principles, not by cross-domain structures.

To sum up: at the beginning of this chapter I distinguished between two anthropological accounts of causal thinking. There is a pervasive tendency to explain causal judgments on the basis of constraints imposed by abstract principles of causation. It should now be obvious that this account is deeply flawed. The anthropological idea that people who hold seemingly counterintuitive causal assumptions either "have a different conception of causality" or "suspend the ordinary requirements of causation" is conceptually confused because there is nothing much to "suspend" or "diverge" from. It is impossible to consider the causal judgments people actually make without considering what empirical generalizations are brought to bear on the events considered. We must therefore turn to anthropological ideas about the representation of cultural knowledge and its consequences for causal thinking.

Causal Schemata and Explanations

The alternative anthropological idea of causal thinking is that causal judgments are made natural by the existence of implicit cultural models or theories, of which they are theorems. In the same way as the "principle-based" approach described above, this anthropological conception found its clearest expression in some contributions to the "rationality debate." The aim was to account for the fact that people can make seemingly "strange" causal judgments, notably in the domain of magic. The "intellectualist" answer was to posit that cultural knowledge consists of explanatory theories (see, e.g., Skorupski 1976; Horton 1982; Penner 1985). More generally, most anthropologists would probably accept some version of what I will call the *schematic* approach. In this view, members of a group are described as holding true general models (e.g., about ancestors and illnesses), which specify what causal interpretation can be given to whole classes of events. If a given event or state of affairs is an exemplar of one of these classes, then the theoretical principle is applied, and a causal judgment is therefore deduced from the empirical generalizations. This type of understanding of causal thinking informs most anthropological work on causal assumptions.

The notion of causal schemata seems extremely straightforward. The hypothesis is that, in order to make a causal judgment, subjects resort to mentally represented causal generalizations, which the singular event or state of affairs considered is supposed to instantiate. In this view, cultural knowledge consists of abstract rules specifying relationships between conceptual slots, such as:

IF (ancestors' anger)
THEN (poor crops)8

The slots in these schemata are variable ranges, which can be filled with representations of singular objects, events, or states of affairs, thereby producing *propositions*. To take Needham's example, people brought up

8. The "if-then" formulas should be taken here as representing causal schemata, so that "if A then B" can be read as the natural sentence "A causes B," and nothing more. The formulas are not necessarily analogous to material implication or entailment.

in certain groups in Borneo are led to hold true a causal schema of the form:

IF (possession of enemies' skulls)
THEN (prosperity)

If they identify certain events or states of affairs as being instances of the conceptual slots in the schema, they can deduce singular causal judgments, such as:

IF (the presence of this skull in our house at this very moment)
THEN (our having good crops this year, X recovering from her illness, etc.)

The main difficulty in discussing this conception is that it may seem self-evident. How could people hold that having this skull in their house caused their having good crops, without holding that possession of skulls generally produces well-being? There are, however, some difficulties in this description. Formulated in philosophical terms, the schema-based description posits that singular causal judgments are derived from *covering laws.*9 I will not dwell here on the philosophical difficulties generated by a "covering law" account of causation. Instead, I will try to show that its psychological application to the description of causal thinking, especially in the domain at hand, poses difficult problems, which are entirely neglected in anthropological descriptions. The notion of causal schemata seems self-evident only if it is described in vague, intuitive terms. I will focus here on two consequences of this approach. First, the schema-based description implies that singular events or states are unambiguously identified as instances of general types. Second, it assumes that the general principles (schemata) are part of a stable knowledge structure that is applied deductively to singular cases. On both counts, the schema-based approach seems less than satisfactory as a description of the way cultural representations are used in causal judgments.

An Example: Magical Stones

In order to illustrate these points, I will make use of an example taken from M. Brown's account of magical practices among the

9. For a detailed philosophical discussion of covering laws, see E. Sosa 1975, D. Davidson 1975, and P. Humphreys 1989. For alternatives to the covering-law account, see Mackie 1974 on complex conditions, D. Lewis 1975 on the counterfactual interpretation of causal connections, and Suppes 1970 for a probabilistic interpretation.

Aguaruna of the Peruvian Amazon (Brown 1985a, 1985b) and then examine some general consequences of the problems raised by this specific case. Some Aguaruna magical activities require the possession of special stones, used for various purposes: hunting, seduction, the fertility of gardens, and so on. These objects are supposed to bring about or facilitate the effects desired by the owners. Their possession is a matter of great secrecy. There are three main types of "magical" stones, classified on the basis of the type of effects they are supposed to have. *Yuka* stones are said to have a power of attraction and are therefore used by men in both hunting and love seeking. In order to attract game, the stone is covered with red face-paint, which is then applied to the hunter's body and to his bow. These stones can be used also as love-charms. In that case the paint is applied to the owner's face. *Nantag* stones are primarily used by women; they are said to increase the productivity of the gardens. The stones are put in a bowl containing a decoction of several plants. The liquid is then poured on the cuttings of yam or taro before they are planted. A third type, *namug*, is specifically connected with war magic. Such a stone, if properly used, "attracts" the enemy and gives an easy victory.

The stones used for such magical purposes do not necessarily belong to a certain type of minerals, nor does the distinction between *Yuka*, *naming*, and *Nanto* map onto any natural differences. The tripartite "classification" mentioned here is not based on any observable criteria, such as shape, color, or touch. As Brown points out (1985a, 374), the fact that a stone is said to belong to a certain category is a question of identification rather than of classification (after a distinction originally emphasized by Ellen, 1979, 341). A stone is supposed to be, for example, *yuka* and not *namug* because it has whatever makes it efficient in the relevant domain (hunting in this case), not because of external features

that would make it obviously different from other, non-*yuka* stones. There do not seem to be any hypotheses about what makes stones of a given type have specific effects. Although there is a definite assumption, for example, that owning a *yuka* stone will increase one's success in love, there is no "model" of the way such effects are achieved. This of course is a very common characteristic of magical claims, and it supports Needham's critical point about ethnographic distortions. Causal connections are often posited in the absence of any belief, or indeed any conjecture, about how and why the causal connections obtain.

The beliefs concerning magical stones seem to be founded on three fundamental premises. First, all stones belong, unambiguously, to one

of the named categories or else to the residual category of ordinary, nonmagical stones. Category membership is exclusive; no stone can be said to belong to several categories. Second, there is a direct relationship between the fact that a stone really belongs to one of these categories, on the one hand, and its causal powers, particularly on its owner, on the other. Third, category membership, as far as magical stones are concerned, is a natural fact. One cannot make a magical stone, one cannot even make a stone magical; this is especially important in contrast with other magical objects, which are clearly conceived as artifacts, the efficacy of which implies that a precise recipe has been followed. In other words, whatever makes a stone *yuka* or *nantag* or *namug was* already there when it was found, though it was not directly observable.

Taxonomies and Causation

The application of a "causal schema" to singular events or states of affairs requires that the latter be identified as belonging to a certain class. Suppose that one holds true the following schema:

IF (conflict with the earth spirits)
THEN (poor crops, family rows, infertility)

In order to apply this schema to actual circumstances, one must identify these events or states as being, unambiguously, instances of the concepts in the schema. The situation at hand must be clearly identified as constituting a "conflict with the earth spirits" and its alleged effects.

The Aguaruna example shows that this identification process is not always as simple as it may seem. It also illustrates the close relationship between (1) identifying a particular object or event as a member of a class or kind, and (2) making causal judgments about that event or object. Having a taxonomy of objects or events, in a broad sense, means having a repertoire of conceptual slots to sort out singular items. Identifying causal powers means having expectations about how objects or states are likely to occur or change in given conditions. These two activities are constantly feeding back onto each other: taxonomic assumptions are the basis of causal expectations, and conversely, causal expectations lead to innovations or corrections in the taxonomic identification. In the Aguaruna example, the judgment that a given stone belongs to a certain category implies certain expectations as to its causal powers; conversely, the identification of certain events as caused by a certain stone implies that the stone belongs to one of the magical categories.

This is in fact a very general aspect of the identification of objects as belonging to natural kinds. Being told that some object is a TIGER (as opposed to ZEBRA, GIRAFFE, STUFFED CAT, etc.) leads to particular expectations about the animal's behavior. Here taxonomic identification imposes constraints on the range of causal propensities of the thing identified. Conversely, an examination of causal propensities can lead to a revision of former expectations10 As I pointed out in chapter 3, theories of conceptual structure must make a distinction between the representations that form the conceptual structure and those additional representations that can be used as recognition procedures. Although the recognition procedures for classes of natural and artifactual objects make extensive use of perceptual criteria, these are generally conceived as the outcome or symptom of a particular underlying causal structure.11

The representation of magical stones therefore seems to be very similar to that of exemplars of living kinds and natural substances. There is, however, another aspect that makes magical stones special, namely the *uncertainty* of identification. As Brown makes clear, finding out whether a stone belongs to any of the three categories is a matter of reasoned guesses and corrigible inferences. A stone is assumed to be "magical," nontrivial as it were, and to belong to a specific type, on the basis of putative causal properties. The conjecture is that, if the stone is used in a certain way, it will bring about a roughly identified type of effects. Such conjectures are the starting point for a long process of identification of the stones through personal experience. The first clues are given by the circumstances of discovery. Stones found in the body of hunted animals, for example, are more likely to be *yuka*, good for hunting. When they are found in the bowels of aquatic mammals, they are associated with

10. This happened for instance to JADE, formerly believed to be a natural kind, until physical and chemical tests showed that two minerals are commonly classified as JADE. The tests show that two JADE objects can have different causal propensities (e.g., react to chemicals in different ways) and must therefore be classified in two distinct categories.

11. Indeed, some philosophers argue that only categories based on specific causal propensities can be recognized as "genuine" or "natural." S. Shoemaker for instance (1980, 291), trying to substantiate P. Geach's distinction between "genuine" and "mere Cambridge" properties and kinds (Geach 1969, 71), points out that the latter do not correspond to "distinctive causal powers." COPPER and IRON are genuine kinds because the fact that some object is made of iron is likely to have some general effects that are noticeably different from what would happen if it were made of copper. No such general expectation is possible with pseudo properties, such as BEING NEAR KING'S COLLEGE or BEING TALLER THAN SOCRATES (Shoemaker 1980, 294ff., examples mine). This point does not apply only to scientific categories; it is a common feature of schematized concepts, in all conceptual domains.

water spirits, and consequently with love charms. Subsequent experience, however, may modify these conjectures. Dreams and omens are especially important, as well as more direct evidence, such as some significant or unexpected success in love seeking, gardening, war, or hunting.

This uncertainty, far from being a specifically Aguaruna phenomenon, is in fact a general property of such identifications. Although the Aguaruna example concerns the identification of exemplars of putative natural kinds (the types of stones), the point would apply equally well to artifacts. In many cultural environments, magical objects are created by submitting the materials to a specific treatment. For instance, a bundle of leaves is made magical by reciting a certain spell over it, then tying it with a special type of string, and so on. The underlying assumption in all such magical recipes is that the preparation will result in an object that belongs to a certain kind. A magical "fetish" is not only a bundle of leaves or a piece of cloth or a lock of hair. It belongs to a special category, with special causal properties. In many cases these kinds of artifacts are named. Always open is the question of whether the recipe was efficient in a specific casethat is, whether the artifact really belongs to the magical category in question. That it does is only a matter of conjecture and *ex post facto* inferences.

Causal Schemata and Abduction

This leads us to the second problem mentioned at the beginning of this section. The schematic description of cultural knowledge suggests that people hold true certain empirical generalizations, and then observe that some singular situations can be subsumed to these generalizations, thereby allowing some inferences and expectations about the situation. The main hypothesis is that culturally transmitted empirical generalizations are used *deductively*, to generate inferences about singular events or states. In the Aguaruna example, however, the principles do not seem to be used in that way. It may be of help at this point to make use of a classical distinction between two types of causal explanations, *deductive* and *abductive* respectively. In the deductive type, a set of general principles can be used to demonstrate that a particular connection is necessary. For instance, once a series of general principles concerning the chemistry of acids and bases are accepted, it is possible to explain how salted water can be produced by combining hydrochloric acid with caustic soda. The particular demonstration can be treated as

a theorem derived from the general principles. This is very much the format that anthropological theories attribute to cultural explanations. Cultural knowledge is described as a stable set of schemata, codes, and so on, from which the interpretation of singular situations can be deduced. Abductive explanations, on the other hand, consist in putting forward conjectural assumptions that, if true, would account for the data observed. Many causal explanations produced in natural contexts are of the abductive type. Imagine for instance that a patient manifests all the usual signs of an infectious disease. Yet the symptoms do not seem to change after treatment with antibiotics. The natural explanation, in such a case, is that the disease is the consequence of a viral infection. An additional hypothesis is therefore produced, such that it would make the results possible. Abduction is "induction in the service of explanation, in which a new empirical rule is created to render predictable what would otherwise be mysterious" (Holland et al. 1986, 89). Abduction is a variety of nondemonstrative inference, based on the logical fallacy of affirming the antecedent from the consequent ("if *p* then *q*; but *q*; therefore *P*"). Given true premises, it yields conclusions that are not necessarily true. Nevertheless, abduction is an indispensable inference principle, because it is the basic mechanism that makes it possible to constrain the indefinitely large number of explanations compatible with any event.

The main purpose of abduction is to make surprising data unsurprising by positing an assumption, of which the data would be a normal consequence. To return to the Aguaruna example, the inferences people make when observing the effects of the magical stones are all of the abductive type. As Brown points out, the identification of a stone is a long process, and at each point the tentative identification is only a plausible guess. That a stone belongs to a certain type amounts to an abductive inference, based on the following reasoning: certain typical effects are observed, but the stone being of a certain type x would produce these effects; hence the stone does belong to that type x. In this simple case we can see how the idea of "cultural models" used in a deductive way to generate singular causal judgments is wide of the mark. The identification of a stone as belonging to a certain type is precisely not the starting point of the reasoning, but its outcome. It is represented not as a matter of fact but as a plausible guess.

Most causal judgments in the domain of "magical" connections are of this type. People say that the person is ill because he or she is a member of a certain cult, they claim that the divination ritual failed because

someone infringed the ritual prohibitions, or that the magical spell failed probably because the ancestors were angry. To translate such reasonings as deductions from cultural schemata is a distortion that is probably as damaging as the metaphysical fantasies criticized by Needham. People who use a conjectural generalization in an abductive way to explain the occurrence of certain particular states of affairs, and people who use these principles in a deductive way for prediction, are not engaged in the same intellectual activity at all.

General Remarks

The notion of "causal schemata" seems unsatisfactory, at least in its rigorous interpretation. The connections between empirical generalizations on the one hand and causal judgments on the other do not seem amenable to a description in terms of schemata, at least in the domain of religious causal claims. The identification of a particular event or state of affairs is, in this domain, a corrigible conjecture; furthermore, the empirical principles themselves may be produced by abductive conjectures, rather than used in a deductive way. The defects of this account are symmetrical to those of the "principles of causation" approach. The latter was too lax, postulating general principles of causation that would in fact allow indefinitely many "magical" connections, many of which are never entertained by the subjects concerned. The schema-based conception, on the contrary, is too rigid, postulating a connection between general knowledge and particular judgments that would outlaw most causal judgments in both everyday life and religious matters.

The question of religious causal judgments can be rephrased as a problem of constraints on inferences, in terms similar to those used in chapters 3 and 4. Particular causal judgments, in many domains and particularly in religious occurrences, are partly composed of specula-five, nonschematic assumptions that are not inferred from stable, causally integrated conceptual structures. However, they are not the product of unconstrained imaginative processes; they typically focus on certain types of causal connections, leaving aside many other possible connections. Our aim therefore should be to describe the cognitive processes that impose constraints on the range of causal judgments held plausible.

Explanations and Intuitive Assumptions

The psychological evidence mentioned here and in chapter 4 makes it possible to put forward a more precise description of the relevant cognitive processes. This is where the connections between nonschematic assumptions and conceptual schemata become pertinent. Here, again, it may be of help to give an ethnographic illustration. J. D. Keller and C. Lehman's discussion of Vanuatu magic (1991, 1993) is one of the very few attempts to give a precise and plausible description, in cognitive terms, of some "magical" notions and assumptions. It is particularly interesting here, as it is based on the hypothesis that all the assumptions involved are in fact schematic. Against this hypothesis, I will therefore try to show that we must analyze this kind of causal assumptions in terms of the connections between intuitive schematic structures and additional nonschematic conjectures.

Keller and Lehman On Efficacious Resemblance

Keller and Lehman's first aim is to make sense, in a precise way, of the intuitive "complexity" of certain religious categories. The concepts used in religious assumptions seem more complex than everyday referential terms, for example, TIGER, SALT, or TELEPHONE. This complexity cannot be explained by vagueness or polysemy, contrary to what metaphor-based models would assume. It is for Keller and Lehman the result of "conceptual embedding," that is, the fact that the use of religious notions is constrained by underlying theoretical schemata (Keller and Lehman 1993). This assumption guides their analysis of two central concepts of Vanuatu symbolism, *hkano* and *ata*, glossed as MATERIAL ESSENCE and EFFICACLOUS IMAGE respectively. A few examples should suffice to give some idea of the way these complex categories are used. "MATERIAL ESSENCE is the obvious, basic component of... living kinds of things but also... speech, song, canoes and playing cards. MATERIAL ESSENCE is the basic substance and form of something that either is human or stands in a special relationship to human beings .... EFFICACIOUS IMAGE is something that shares recognizable perceptible attributes with the typical representation of a culturally significant thing having a MATERIAL ESSENCE" (Keller and Lehman 1993, 80). The latter

notion applies not only to rock formations and magical objects but also to shadows, the chorus of a song, or the outrigger of a canoe.

The notions *hkano* and *ata* are central in the representations concerning "magic," that is, the use of EFFICACIOUS IMAGES by knowledgeable beings, in order to control various domains of reality. It is considered possible to achieve "magical" effects on things by acting on objects that share some perceptual feature with them. For Keller and Lehman, there is a difference of context, not of meaning, between the everyday and religious uses of the notions. In both cases, the assumptions concerning the notions *hkano* and *ata* are constrained by seven theoretical premises:

1. There are material things.

2. They are "living" in the sense of being connected in a relevant way to human life.

3. Some material things are non-living.

4. Immaterial things exist, like the souls (*ata*) of people and spirits.

5. Material things may resemble each other.

6. Surface resemblance is an index of underlying connections.

7. Such connections make it possible to optimize one side of the resemblance pair.

The schema put forward by Keller and Lehman seems to incorporate two very different types of assumptions. The list of seven premises is supposed to account for both the everyday and the religious use of the notions *ata* and *hkano*. As far as this difference of usage is concerned, one can make a distinction between premises 1 and 3, 4, 5 on the one hand, and 2, 6, 7 on the other. While the first group of assumptions govern both the everyday and the "mystical" usage of the notions, the second set seems relevant only in cases of "magical" connections, and more generally for the construction of religious

representations.

Let me try to examine this point in more detail. Premises 1, 3, and 4 seem to be the direct outcome of intuitive ontologies, as described in chapter 4. They refer to a distinction between animate and inanimate physical objects, and to the existence of nonphysical things like minds and their usual projection in religious terms, namely "souls" or "spirits." These premises can be described as intuitive knowledge, tacitly held true about the world in all possible contexts. Premise 5 is just the recognition of noncausal connections between disparate objects, of the fact that there can be a surface resemblance between things that belong to different categories. As I pointed out in chapters 3 and 4, even young children assume that similarity does not provide sufficient conditions for

category membership. It is therefore possible for two objects to be conceived as both clearly similar in surface features and dearly different in terms of category membership.

Premises 2, 6, and 7 constitute a rather different set. Although they may be expressed as general statements, they are not of universal application. Principle 6 for instance does not apply to all cases of surface resemblance between two objects. There are indefinitely many situations in which people are aware of a resemblance, yet do not judge that it is the index of underlying connections. This is just a consequence of the obvious fact, mentioned in chapter 3, that similarity-based groupings can classify any set of objects in indefinitely many different ways. A cognitive system that is driven by pure (and unconstrained) similarity would be overloaded by a plethora of incompatible categorizations. This applies to religious as well as other kinds of classifications. Even if resemblance is invoked as the justification for a connection, it cannot be sufficient as the principle that governs the connection. The same remark applies to principle 7. Subjects who recognize that there is some underlying connection between two objects do not necessarily conclude that it will make it possible to "optimize" one term of the connection.

To rephrase this in the terms used in previous chapters, it must be noted that the list of propositions given by Keller and Lehman puts together schematic and nonschematic assumptions. The former are intuitive default values that apply automatically; the latter constitute conjectural, probably abductive principles. Now it is interesting to note that, while propositions of the first type apply across all contexts, the non-schematic assumptions are precisely the ones that would be particularly relevant in religious contexts. In stressing this difference, I do not mean to query the adequacy of Keller and Lehman's description. Their point in listing the seven premises was to uncover the conceptual assumptions underlying the semantic representation of *hkano* and *ata*, not to examine their potential usage in causal descriptions. This ethnographic illustration, however, makes it possible to go further in the description of causal judgments, by highlighting the fact that intuitive domain-specific assumptions may be intricately connected with nonschematic magical assumptions.

Intuitive Domain-Specific Principles As Constraints

We are now faced with another example of the process described in chapter 4, as regards ontological assumptions. Religious

ontologies combine intuitive schematic assumptions, which are generally tacit, and explicit nonschematic ones. I argued in chapter 4 that the intuitive assumptions impose constraints on the range of inferences that can be drawn from explicit counterintuitive religious claims. In the same way, I will argue here that, in the domain of causal judgments, intuitive domain-specific principles constrain the range of causal assumptions that can be held plausible.

In order to make the connection more salient, it may be useful to return to the example of Aguaruna magical stones. The conceptual framework within which Aguaruna magical beliefs are produced is that of intuitive theories of natural kinds. People who handle magical stones and speculate about their effects use premises that are used in the everyday treatment of natural objects. They consider that categories of natural objects are individuated by underlying essences, which cannot be directly observed; that kinds can be differentiated by their causal powers, understood as a consequence of their essences; that the essence of a given object cannot change. All these principles constitute the intuitive essentialism that organizes the conceptualization of natural kinds. To reiterate a point made in chapter 4, such assumptions are developed

spontaneously; they do not need to be culturally transmitted. It is important to point out here that such intuitive principles, once applied to a domain, impose strong constraints on causal judgments. This is particularly clear in the interpretation of change. If any change in effects is observed, the only interpretation is that the first "effects" were in fact contingent events. If there is any divergence between expectations and actual effects, it must be because the expectations were founded on a mistaken identification. Since the categories are construed as essential, transformations are excluded.

That ontological and causal assumptions should be constrained in parallel fashion is not really surprising. One major point that emerges from the psychological (particularly developmental) study of causal thinking is that intuitive ontologies and intuitive expectations of causal powers are two facets of the same distinction. Children (as well as adults, and scientists) postulate categorical distinctions on the basis of differences in causal propensities, and conversely, they expect different causal processes from exemplars of different categories. As a consequence, their intuitive "theories" include many precise expectations about what causal processes different objects can enter into. Live tigers and stuffed ones are not likely to react in the same way to the same events. This difference is largely a consequence of or a constituent of the ontological distinction

between LIVING KINDS and INANIMATE OBJECTS. This extends to all such ontological differences; the ontological assumptions held relevant to a given situation activate particular causal expectations, and vice versa. Intuitive ontological assumptions are projected to religious entities; their consequences for causal expectations will be projected as well.

If causal expectations are just another aspect of intuitive ontologies, then using the intuitive ontologies in religion means using the intuitive notions of causation as well. Religious causal assumptions, like the ontological assumptions of which they are just another aspect, comprise two types of representations. Some principles are directly derived from intuitive understandings of large ontological domains (e.g., NATURAL SUBSTANCES, LIVING KINDS, PERSONS, ARTIFACTS, etc.). Other principles are culturally transmitted speculative assumptions that partly violate the intuitive ontologies, such as the idea that a lock of hair, once treated in a special way, becomes more than just a lock of hair and can have special causal powers. In their theories of causal judgments, most anthropologists take it for granted that the only element that can limit the range of causal judgments is the explicit, speculative part. Here I have argued that on the contrary, important constraints derive from these intuitive assumptions that are used as default values in the construction of religious representations.

This may account for the fact that the actual causal judgments people make are much more constrained than explicitly transmitted "cultural models" would warrant. To illustrate this, let me return to the example of the Fang notion of ghosts (*bekong*) described in chapter 4. As I pointed out, the reasonings Fang people produce about the ghosts' behavior entail a set of complex assumptions about ghosts' psychological processes. Ghosts are represented as perceiving, knowing, wanting particular states of affairs, acting on the basis of their representations of those states, and so on. Fang people, however, never have to acquire the principles of "ghost psychology." These principles are a direct projection of intuitive psychology, most of which is developed spontaneously in the course of conceptual development, without any cultural transmission. The same argument applies to the causal aspects of the ghosts' behavior, which are in fact just another aspect of ghost psychology. Because ghosts are represented as a kind, it is implicitly assumed that it is possible to generalize on the basis of a few singular instances. For example, people do not need to be taught any general statement to the effect that ghosts can appear to the living in the form of a wild animal in the forest. A single instance in which a ghost is described as appearing in that form is enough

to create the expectation that all ghosts can achieve such transformations. Again, this is because the ghosts are conceived as a natural kind of entity. Thus certain causal propensities of one exemplar are immediately projected onto the kind as a whole.

In other words, intuitive ontologies are instrumental in creating definite expectations about the causal powers of religious entities. I would go further, and claim that such constraints are the *only* element we need in order to account for the causal judgments people actually make. Causal judgments seem so varied, in any single "culture," that it is difficult to

imagine what conceptual scheme could ever encompass them. If we focus on their underlying assumptions, however, it turns out that the judgments invariably conform to a few stable principles, namely, that entities of the same kind will have the same causal powers and that those causal powers can be predicted on the basis of the intuitive ontologies projected onto the religious domain. Beyond this, there are indefinitely many specific assumptions, which create the attention-demanding aspects of religious causal judgments. However, the stable elements, which are recurrent in the religious systems of many different human groups, are not those historically contingent assumptions. They consist in principles derived from intuitive ontologies. The major mistake of anthropological theories of magic, and of causal thinking in general, was to assume that, because religious judgments differ from one human group to another, the only elements that can constrain them must be cultural. In fact, they are mostly constrained by the activation of intuitive ontologies, that is, by something that is not transmitted culturally and in fact is not "cultural" at all.

6
Essentialism and Social Categories

Religious interaction, like other types of social interaction, presupposes that the persons involved occupy defined positions, recognizable "roles," or "statuses." In this chapter I will deal with the aspects of this question that are of direct relevance to a description of religious representations. The "social category repertoire" may in principle include all sorts of distinctions between social actors. Certain rituals are exclusively performed by males or females or elders or people from a certain clan, and so on. Here, however, I will focus on stable, named categories such as PRIEST, SHAMAN, DIVINER, the understanding of which is primarily religious. I will be concerned with those categories in local sets of religious notions, not in anthropological or sociological theory. I will try to elucidate the cognitive processes whereby these positions are represented and classified, the reasonings that make it possible to identify people as members of one social category rather than another, and the way the terms designating the positions are represented and acquired. Being brought up in a particular human environment, subjects are led to use certain social categories, to reason about whether they apply to particular persons, and to make inferences from that application. We must evaluate to what extent such representations are constrained by functional properties of human minds, and whether the latter make certain types of ideas about social categories particularly likely to be acquired and transmitted. This of course is not meant to suggest that actual social positions are *just* series of concepts or the effect of

conceptual mechanisms. They are also the outcome of processes (social dynamics, economic and ecological constraints, etc.) that have nothing to do with cognition. Indeed, one of my points will be that we cannot really understand or even evaluate the recurrence of certain ways of conceptualizing social categories unless we sort out in a very clear way cognitive from noncognitive constraints.

The argument of the chapter is organized around a single hypothesis, that "essentialist" interpretations of social positions are pervasive in people's representations of religious social categories, a fact that is generally underestimated in their anthropological description. The essentialist hypothesis goes against the grain of anthropological wisdom, which could be roughly summarized by two principles. One is that "cultures" generally provide definitions for social categories. The other is that such definitions are used by people to determine whether a given person is or is not a member of a given category. Both principles seem rather harmless, perhaps even trivial. Their application, however, makes it difficult to appreciate what cognitive mechanisms are brought to bear on the understanding of local categories.

Determinate Extensions and Their Criteria

In this section I will discuss the question of the mental "definition" of social categories in an indirect way, by describing some categories that are not amenable to a classical description in terms of typification. I will start with two examples of what I will call an essence-based understanding of social categories. The point of these examples is to illustrate some aspects of religious social categories that, though certainly not universal, are recurrent enough to provide a starting point

for our inquiry.

Determinate Extensions: Two Examples

The first example is that of the Fang ritual specialists, briefly mentioned in chapter 2. Among the Fang, most religious positions are connected to the notion of *beyem*, that is, people endowed with that special quality or capacity called *evur*. The various religious social categories are subtypes of *beyem* and are generally characterized in terms of

their typical religious function. Among these, three categories stand out as particularly salient in terms of religious action. The *mod ngam* (literally "men of spiders") are specialists who use spider divination to establish the origin of various cases of illness and misfortune, and to advise on important decisions. Other specialists, called *ngengang*, have the necessary knowledge and capacities to deal with witchcraft and also cure illnesses and other types of misfortune brought about by the ghosts. Finally, the specialized storytellers called *mbommvet* sing long historical and mythical epics, accompanying themselves on the instrument called *mvet* (Boyer 1988). Epic performances are one of the contexts through which people are introduced to ideas concerning the ghosts and their effects on people's lives. People's spontaneous characterizations of these various categories generally focus on the special type of activities associated with each label. *Ngengang* are "people with recipes," that is, people who have acquired magical remedies from a master. *Mod ngam* are "those who use a spider to see hidden connections," and in the same way *mbommvet* are simply characterized as those who recite the epics. The problem is to understand the nature of the link between these typical activities and the concept itself. The most natural description, which would be compatible with anthropological wisdom, would be to assume that these activities *define* the social categories. This would also be the gist of the "typification" approach, which is pervasive in sociological models (see, e.g., Berger and Luckman 1967). Each of the positions would then be taken to correspond to "socially constructed" forms of typified behavior. This, however, is not entirely consistent with some aspects of the data. For instance, people readily characterize the *mbommvet* as someone who plays the instrument and knows the repertoire of epic tales. These are the two criteria invariably cited by Fang speakers. However, many people who fulfill such criteria are not considered *mbommvet* at all. It also happens that some persons formerly said to be *mbommvet are* not so considered after a while. There is therefore a not insignificant number of people who apparently meet the requirements for membership of the category *mbommvet*, yet who are not considered as members of that category. The same can be said of other religious positions, among the Fang. The *ngengang* are typically understood to perform specific healing rituals, during which they communicate with ancestors/ghosts (*bekong*) and provide specific recipes for treatment. Again, there is a certain degree of uncertainty as to whether a given healer is or is not a *ngengang*. Some people who perform the rituals and commonly prescribe are still not considered *ngengang*. Some people are

considered *ngengang* although they are not observed to perform such rituals.

Such facts can be better understood if we remember that *ngengang, mbommvet*, and other such terms are in fact subordinates of the larger category of *beyem*, that is, people with *evur*. Storytellers who are said not to be *mbommvet are* in fact suspected not to be *beyem*, not to have what makes it possible for storytellers to acquire secret knowledge from the ancestors. In the same way, when someone performs the healing rituals yet is not considered a *ngengang*, it is because he/she is not considered a *beyem*. It is admitted that such people may know successful remedies. For all their knowledge, however, if they are not *beyem*, that is, if they do not have *evur*, then they are not *ngengang*.

The problem here is to understand what makes it possible to decide that a certain person is an exemplar of the category. The activities usually linked with a certain position can be described as a *typical* identification of the category. What makes one a *mbommvet* or *ngengang* cannot be reduced to such observable features as playing an instrument or organizing certain rituals. To sum up, we have here a combination of two features which does not really fit the notion of "social typification." First, there is a notion that certain religious positions correspond to kinds of people, understood to be different from the others. Second, the criteria that come to mind when characterizing them do not seem to be considered necessary, or even sufficient for identification.

The combination of these two features is not particular to the Fang. Indeed, it may well be one of the most general

features of religious positions. To illustrate this, let me take another example, from a cultural environment that is rather remote from the Fang. This is drawn from H. Fabrega and D. B. Silver's study of shamanism in Zinacantan (1973). Shamans (*h'iloletik*) are characterized by their specific medical powers. They are the only persons who can actually receive messages from the gods (ibid., 204ff.). The process of becoming a shaman is particularly interesting here. As Fabrega and Silver put it, it consists of a process of *recognition* rather than election, and the process is "gradual, informal, and covert." It is a process of gradual discovery of their powers and of recognition of these powers by the surrounding community. Subjects typically have strange dreams in which they are ordered by the ancestors to become shamans, or they have epileptic seizures, which are taken as a sign of uncontrolled possession by the gods or ancestral spirits. They then learn their craft from other shamans and acquire original recipes directly from the gods. They first perform rituals to cure close relatives

and other people in their villages. Then the rumor spreads and the reluctant practitioner is forced to admit that he or she is a shaman. The new shaman marks this by taking part as a shaman in the public ceremonies, with the symbols of the office (ibid., 31ff.).

This informal process is not the only path to recognition. There are also formal ceremonies of "election," during which a new shaman is supposed to receive official recognition of his or her "powers." The ceremony is called *tsva'an sba h'ilol*, "to stand up as a shaman." The new shaman and an older specialist visit all the shrines and sacred springs of the surrounding villages, asking the gods to collaborate with the new healer. A striking feature of Zinacantan shamanism is that this formal recognition, which supposedly identifies the person as a shaman with the gods' blessing, in fact triggers more doubt about the shaman's abilities than the informal process. Fabrega and Silver observe that "most [shamans] do not undertake a debut ceremony, and many view one as a sign of incompetence, feeling that the new [shaman] who performs it has not undergone an authentic vision and is not *p'ih* (intelligent and spiritually outstanding)" (ibid., 34). The premise here is that a new shaman who needs the intervention of an older one is not competent enough, has not received efficacious prayers and formulas in dreams.

This idea is congruent with the widespread notion that not all shamans are efficient: "some *h'iloletik* are authentic and competent, having received their powers from the ancestral spirits. Others are spurious and have no abilities; they practice only to get chickens, meals and liquor by cheating their patients" (ibid., 41). These are not considered "real" shamans (ibid., 148). Doubts about the shaman's real abilities are typically voiced when the shaman becomes too drunk during the offerings or insists on using alcoholic beverages to the exclusion of other offerings (ibid., 148). Zinacanteco representations about what makes the difference between shamans and nonshamans are rather vague, although there is a definite intuition that a person either is or is not a *h'ilol*, and that this is some form of predestination. The diseases that afflict the shaman-to-be are conceived as a consequence of unobservable properties that make him or her a *h'ilol*. The doubts concerning the healer's abilities are typically expressed in terms of doubts concerning the person's identity as a shaman. In this framework, there is no such thing as an inefficacious shaman, but there may be impostors who perform rituals yet are not shamans at all.

Let me insist on an aspect of these data that may seem trivial, probably because it is generally true of such religious positions. What is obvious

in the Zinacanteco case, and could be said of many other examples, is that the identification of a particular person as a shaman is a conjecture. Given a particular person's behavior, he or she is identified as a *h'ilol*, but the subjects who represent this proposition always represent it as a plausible inference from the observable data. The proposition does not carry any certainty. This is made obvious in people's ideas about the existence of frauds and genuine mistakes in the identification process. The fact that identification can be refuted or corrected implies that, even in cases where a person is clearly recognized as a holder of the position, this is only in terms of plausible inferences.

It is easy, however, to misunderstand this phenomenon. One possible misunderstanding would be to think that identification is plausible rather than certain because the whole domain of religious entities and processes is shrouded in

mystery. This is clearly not the case. In Zinacantan for instance, people clearly accept that the identification of a shaman is a matter of plausible guesses. The same subjects hold as certain, not just plausible, that gods and ancestors have some influence on the living, that (true) shamans have some powers given to them by the gods, and so on. In other words, not all propositions in the domain of shamanism are equally uncertain, so the uncertainty concerning position cannot be explained by the fact that the domain as a whole is vague and elusive.

Another, more serious confusion would consist in misunderstanding the relationship between the social processes and dynamics inherent in such phenomena of identification and correction, on the one hand, and their cognitive counterpart, on the other. That people are ascribed a certain position, that they are confirmed in it or sometimes said to be frauds, are all social processes that can be explained in terms of influence, consensus building, coercion, occurrence and interpretation of historical particulars, and so on. People who are ascribed such positions as "shaman" or "diviner" are caught in a web of social relations which is intrinsically unpredictable. The political motives that made it profitable or inevitable at some point to recognize them as shamans may then make it equally necessary to deny them any such capacities. Being recognized as a shaman is, in part, the emergent effect of a transient state of social relations. This much is obvious, but it would be a mistake to assume that this ephemeral character of identification is actually represented *as such* by the actors. The shamans certainly change status as a result of multiple factors. Their clients interpret those changes as the correction of mistakes; the person was not a shaman and was mistaken for one, or the converse.

The "Social Kinds" Interpretation

The situations illustrated above are not really exceptional. Anthropologists will have recognized familiar aspects of religious systems. Membership of the categories is obviously construed as a yes/no question; for the groups concerned, one either is or else is not a *ngengang* or *h'ilol*. At the same time, however, most of the criteria that could be used to characterize these social categories turn out to be neither necessary nor sufficient. In other words, the cultural representations connected to a certain label cannot constitute a definition. They do not provide criteria that would allow one to decide whether a given person is or is not a member of the category. The spontaneous, pretheoretical notion that social categories have a "cultural definition" appears rather inadequate in such cases.

In the Fang example, the identification of a person as a *beyem* is based on two types of general features. There is, on the one hand, a series of observable traits, like the fact that a person is said to have undergone a certain initiation, that he or she performs certain rituals, and so on. On the other hand, these elements are neither necessary nor sufficient. The idea that a person is a *beyem* is based on the assumption that he or she has "something more" than the superficial features, something that all members of those categories have. No one can represent what it consists of, but it has to be there; otherwise, whatever one's activities, one is not an exemplar of the category. External typical criteria are just indirect (and insufficient) evidence of the fact that people really belong to the category. This "essentialist" interpretation of the group of *beyem* makes it possible to understand both the vagueness of people's statements about what makes *beyem beyem*, and the idea that any particular person either is or is not one. These features of the category BEYEM led me to put forward the hypothesis that such categories are represented in the same way as natural kind terms (Boyer 1988; Boyer 1990, 104ff.). The representation and use of a natural kind term always involves general assumptions about the *typical features* of the exemplars of the kind, on the one hand, and the presumption of an *underlying trait* that is common to all exemplars of the kind, on the other.

In such cases, it seems therefore possible to describe the assumptions underlying the representation of the position as an extension to social differences of spontaneous assumptions that prove extremely successful in dealing with the natural world. The representations concerning categories could then be described as organized by principles that are

mapped from biological knowledge onto putative "social kinds." This interpretation not only makes sense of both features mentioned above (determinate extension and typical criteria) but it also provides a simple explanation for the numerous cases in which biological metaphors are *explicitly* used to describe social categories. This is perhaps one of the most recurrent features in the cultural representation of social categories. Ethnographic studies in the most diverse

environments show how pervasive this understanding is. Often, different social groups are compared to species or even *called* "species"; the difference between a group and the rest is construed as that between humans and nonhumans; the identity of a group is explicitly construed as similar to that of a living kind, and so on. If my interpretation is correct, this recurrent "naturalization" of social categories should be taken as the metaphorical outcome of a process whereby social categories are *literally* treated as kinds. That is to say, what is expected from them, in terms of superficial resemblance and underlying features, is exactly what is expected from natural kinds. Obviously, as the Fang and Zinacanteco examples show, there need not be an explicit metaphorical construction in order to have such an analogical mapping from biological kinds. The underlying principles, however, would explain why such metaphors, when they are available in the cultural environment, are particularly likely to be transmitted.

This interpretation, which is compatible with the ethnographic data and theoretically plausible, is not really complete, either empirically or theoretically. From an empirical viewpoint, it remains to be considered to what extent the type of social roles described here are typical of religious social categories. The examples above focused on certain types of religious activities; we must therefore see if other activities involve the same type of interpretation. From a theoretical viewpoint, we must describe in more precise terms the way "naturalized" interpretations can be acquired and represented. The next two sections will focus on these empirical and theoretical problems respectively.

Religious Roles and Institutions

To most anthropologists, the picture of religious roles given here may appear rather slanted, in the sense that I have emphasized what is usually considered as only one aspect of religious roles. This cognitive description seems to ignore the classical distinction between

two types of religious positions, which could be called *magician-prophet* and *priest*, to use Weber's vocabulary if not his concepts. While some religious roles are construed as the consequence of personal capacities, others are founded on seemingly impersonal criteria. Partially congruent with this opposition, there is a contrast between religious personnel whose legitimacy is constantly reaffirmed by specific performances and those religious officers for whom it is provided by external institutions. Thus, one can contrast the position and legitimation of a Siberian shaman with that of a Catholic priest. Or again, to take an example where both types of positions are found in the same environment, one can find both "scholars" and "saints" in the Muslim religious personnel. On one hand, the '*ulema* are identified as bearers of a scriptural tradition, notably of its legal and moral aspects. On the other hand, a variety of local saints and sheiks exert considerable authority by virtue of personal qualities, these being the consequence of God-given grace. So the descriptions given in the first half of this chapter may seem to ignore the sober, scholarly, institutional side of religious personnel, the religious functionaries, and to give pride of place to the more prophetic or even ecstatic representatives.

There is no space here to comment on the ethnographic pertinence or theoretical coherence of the opposition. I will therefore focus on an aspect of this question which is directly relevant to our description. In its treatment of religious roles, anthropology seems to need some kind of theoretical distinction along the lines of the dichotomies mentioned above. At the same time, however, anthropological monographs invariably show that these distinctions are not entirely relevant to the description of particular religious systems, that they are indeed more an impediment than an analytical instrument. This does not imply that the dichotomies are irrelevant or unfounded; it just implies that their empirical interpretation is not altogether clear.

Sociological and Psychological Dichotomies

It may be of help here, in order to avoid artificial complexities, to distinguish the categories and dichotomies by which we can describe a certain "social system" on the one hand, and the categories used by local actors to represent that system on the other. It may seem (and may well be) pedantic to insist on such an elementary distinction;

the confusion, however, is all too easy in the domain of religious types, and often creates some conceptual equivocations.

On the sociological side, the distinction between two roughly identified types of religious officers is generally founded, however indirectly, on the Weberian notion of *charisma*. In strict Weberian terms, charisma may be defined as the fact that some religious specialists gain authority by being credited by others as having attributes or qualifies essentially tied to their *person*. By contrast, other religious roles may be construed as a series of rights granted by an external institution and not fled to the person as such. A bishop has certain rights, and more generally can have certain supernatural effects, by virtue of being placed in his position by his church. Given the appropriate conditions, any other person might have occupied the same position and would have the same legitimacy.1 One can use the concept of charisma to describe a social status, characterized by particular social dynamics that lead a group to identify one of their members as endowed with particular qualifies. This minimal characterization is sufficient to found a contrast with religious positions that are *not* the result of such dynamics. They are the outcome of a process whereby an institution develops modes of incorporation which refer to externally defined criteria. Guilds for instance incorporate members on the basis of technical proficiency, and to some extent many religious institutions recruit officers in this way. Whether such recruitment is typical of rationalized churches, centralized states, literate elites, and so on can be left aside for the moment. This simple distinction between *person-based* and *role-based* recruitment does not constitute a very refined form of sociological analysis, nor does it claim to be that. It will be sufficient, however, to indicate in what way sociological and psychological aspects of religious positions can be articulated.

1. The notion of charisma has given rise to much anthropological discussion, partly because Weber's formulations, in this as in other domains, are particularly complex. Moreover, the notion is introduced by Weber in the context of a general division between three types of authority and legitimation, namely *traditional*, *charismatic*, and *rational-bureaucratic*. In his description of these types (1968, 1113ff.), Weber combines definitions, ideal types, and examples in a particularly convoluted, sometimes incoherent argument. As many sociologists and anthropologists have pointed out, the tripartite scheme does not really have much descriptive or explanatory power; Gellner for instance points out that the notion of tradition is a "pseudo-concept" (1969,10; see also Tambiah 1970, 1984). The notion of charisma itself, however, once taken out of this tripartite structure, is of great interest. In the strictest sense, it means only that certain religious offices are attributed by virtue of personal qualifies. It is emphatically not a psychological notion but a sociological one.

Let me now turn to the mental representation of the religious social categories. Here, too, we can make a rough distinction between two ways of understanding religious positions. The representation of social categories is often structured by the assumption of natural or essential features. In the previous sections, I described this type of situation at some length; a person is considered by a group to be a member of a certain category because he or she is presumed to possess whatever unobservable feature is special to that category. This, however, is obviously not the only way social categories, including religious ones, can be represented. An alternative to an *essence-based* understanding of a position is a *criteria-based* interpretation. In the latter case, people represent a series of criteria, such that any person who meets them is considered a member of the category in question. Most members of the Church of England will have no difficulty identifying as member of the category VICAR any ordained person who is given the charge of a parish. Obviously, some personal qualities are supposed to be usually or desirably combined with such formal criteria. The absence of such qualifies, however, does not cast doubt upon the identification of the person as a member of the category. If the criteria are there, then the identification is unambiguous.

The point of this distinction between sociological and psychological oppositions is to suggest that the dichotomies may well be orthogonal. That is to say, we may have situations in which a religious office is represented by people in an essence-based way, although it is in fact regulated by institutional criteria of which they are only partly aware. Conversely, some people may try to impose a criteria-based reading on what is, in sociological fact, a person-based position. Such discrepancies are possible because social facts always under-determine their interpretation by the participants. This, again, is a very elementary proposition. It is worth mentioning, however, because I will argue that such mismatches between the way the "system" works and the way it is represented to work are not exceptional in religious categories. On the contrary, they seem to be the more general situation, and this salient fact should be explained.

The Uncertainty Of Sociological Dichotomies

In the above description, I suggested that both the sociological and the psychological dichotomies presented here are rela-

tively simple and straightforward. This, however, is not really the case as far as the sociological aspect of positions is concerned. The distinction between person-based (or "charismatic") positions and positions based on institutional definitions gives rise to many problems of description and explanation. Although the distinction may appear relatively clear in its theoretical formulation, its application to any actual social situation has proved to be ridden with difficult problems. A recurrent difficulty is the following. A certain social environment seems to display both types of religious positions, in a fairly clear contrast to each other. On closer examination, however, it turns out that each of these positions in fact includes many features that, theoretically, should characterize the other one. The original distinction then either seems empirically vacuous or needs to be revised thoroughly. A few examples will illustrate this very familiar phenomenon.

In his description of Nuer religion, Evans-Pritchard (I940) makes a strong distinction between two types of religious officers. "Leopard-skin chiefs" are specialized "priests of the earth," whose intervention is necessary to perform sacrifices. "Spirit-owners" are self-styled prophets, whose possession by one or several spirits gives them particular capacities, such as divination or healing. The role of sacrificial specialist is an aspect of the structure of Nuer kinship and politics; it implies no personal power beyond that which is granted by the structure itself. The function of prophet or possessed healer, however, is relatively independent of that structure and is clearly perceived as the best way of utilizing what is in essence a social disorder. As T. O. Beidelman points out (197I), this description is strongly reminiscent of, and probably directly inspired by, Weber's "idealtypes" of traditional and charismatic religious roles. Beidelman, however, also points out that many features of the Nuer situation go against this simplistic opposition. "Leopard skin chiefs," whatever the institutional nature of their position, invariably try to infuse charismatic elements in their practice and to build rudimentary cults around their persons. Prophets, far from being isolated healers, constitute a strong political response to colonial pressure. In other words, what seemed to be a clear illustration of the tradition-charisma opposition turns out to be more ambiguous. Such difficulties are very common; they occur in most sociological descriptions in which a clear notion of charisma is applied to social dynamics. E. Gellner makes a similar remark about the Berber saints of the Moroccan Atlas. These are supposedly endowed with *baraka*, a form of God-given grace which is "about as close to the sociologist's notion of 'charisma' as one could hope to

find. ... But theirs is a charisma heavily routinized by kinship, and making its contribution to stability rather than acting as an explosive force" (1969, 12).

More generally, a similar difficulty besets virtually all descriptions of large-scale religious institutions. The "official," or theologically oriented, description of religious roles centers on the external, role-based criteria. Priests are defined as ordained, specialized brahmins are defined as caste members who have undergone the initiation rituals and observe ritual prohibitions, '*ulema* are defined as specially trained scholars, and so on. However, all descriptions of such religions "on the ground" invariably highlight the fact that such characterizations are incomplete. Local congregations or groups either ignore them or complete them with representations that are much closer to the "essence-based" model described above. In many cases, what is defined by the institution as a noncharismatic position is locally represented, often in a strikingly heterodox way, as endowed with charisma. This is a very familiar point, the importance of which is often underestimated in the anthropology of religion.

All these difficulties have led authors to think of the charisma versus noncharisma opposition as a pseudo-contrast that does not have any descriptive power and therefore is of little explanatory value. Here I will not discuss this point, or the various ways in which the original Weberian distinction may be made more accurate. I will only try to extract from this situation an anthropological moral, as concerns the mental representation of social categories.

The "Charismatic" Proclivity

Local ethnographic descriptions of established institutional religions invariably uncover local "charismatic" features. These may be ascribed to the very personnel that are characterized in non-charismatic ways by the institution. This is the case for Catholic priests, often taken by congregations to be endowed with special personal qualifies, although the church

would certainly oppose (and has repeatedly tried to curb) such cultic tendencies. In other cases, the groups simply add extra positions to the official religious personnel, as in the Muslim case described above. Such discrepancies (in the Catholic case) and complexifications (in the Muslim situation) are very familiar; they are indeed so familiar that they are often taken as unproblematic in cultural anthropology. They indicate what could be called a strong *charismatic*

proclivity, the apparent need to interpret social positions as based on personal attributes. Social groups tend to "misconstrue" religious social positions as person-based, even in cases where an institution has clear role-based criteria for the categories, and even when such criteria are made explicit and publicly available by literate institutions. Subjects do not just misinterpret social dynamics; they tend to misinterpret them in a very specific way. Indeed, the converse confusion (inventing pseudo-criteria for positions that are in fact person-based) is rare, if it occurs at all, in religious categories.

Before examining the cognitive processes underlying this proclivity, we must describe its mechanism more precisely and see to what extent it challenges anthropological wisdom. In the situations described here, a religious institution provides criteria for membership in a certain social category. A theological or orthodox reading of the social situation would imply that congregations actually represent the categories as founded on those criteria. This would imply that people (1) are actually aware of the criteria, and (2) represent them as the *cause* of identification. Now I would claim that in many situations neither assumption actually obtains. The fact that most subjects have only a vague understanding of institutional criteria is well known and needs no elaboration here. Anthropological descriptions, however, often seem to take for granted that people take their representation of the criteria (however vague and inaccurate) as the cause of identification. That is, even if they have a vague representation of what ordination is, they still take that ceremony to be the cause for membership of the category PRIEST (to take the Catholic example again). This, however, is only a hypothesis, and it seems to me that anthropological data so far do not support it unamiguously. There may be many cases in which people take such formal signs as ordination as the *consequence* of personal qualifies, and anecdotal evidence seems to bear this out.

Obviously, this question could only be settled by proper psychological data. I must insist, however, on the fact that the issue is not clearly decided one way or the other, because cultural anthropology often assumes that observable criteria are represented as the cause of identification. This is in a way a consequence of the fallacies described in chapter 1 and 2, notably the theological bias and the assumption of optimal cognitive functioning. We know that a certain institution has clear criteria that actually work as necessary conditions for certain types of religious office. We also know that people have some fragmentary representation of those criteria. We therefore find it legitimate to assume

that people actually use their representations of the criteria as conditions for membership of the category. It is possible, however, that they do not use them in this way. Representing them as consequences of essential qualities may not be theologically coherent, or even optimally rational, as we will see below. Cultural representations, however, are constrained by actual cognitive processes, not by abstract considerations of theological consistency or optimal rationality.

The "charismatic proclivity" described here should be understood, precisely, as nothing more than a proclivity. It does not imply that religious positions are never interpreted as criteria-based; it only implies that the essence-based interpretation tends to be chosen even in contexts in which the alternative, criteria-based understanding was available. As I said above, social facts under-determine their interpretation, which means that both types of interpretations can be concurrently held in a given human group, and in fact even in one single mind. For instance, Church of England vicars are appointed by a religious bureaucracy, on the basis of an explicit set of criteria. This social fact is generally reflected, in a rather accurate way, in the congregation's understanding of what made a particular person their vicar. Most members of the congregation indeed take the category VICAR as a licence to perform religious ritual, given by the Church of England. Now this does not in any way preclude some members of the congregation from interpreting the fact that this person is a vicar as the consequence of an underlying essence. Indeed, it is often the case that people have both understandings of the category. Depending on the circumstances, they will either consider the person as vicar because of his position in the church or vicar because of underlying, undefined qualities which make a vicar a vicar. Obviously,

holding both interpretations at once would not be optimally rational, since it would amount to explaining the same fact by two alternative causes. But we must suspend those normative considerations here, and simply observe that the coexistence of rival interpretations is nothing particularly exceptional.

General Remarks

To sum up, it is often the case that social categories are interpreted as based on personal, unobservable attributes, even in cases where there are actual institutional criteria that in fact regulate the access to religious positions. This preference for essence-based interpretations is all the more interesting in that it does not constitute the simplest or the most economical way of explaining the fact that a given person

occupies a certain position. It is not simple, because it replaces a set of explicit criteria with the complex notion of an underlying criteria, which is both necessary and undefined. As a result, it makes the identification of every particular actor concerned a matter of conjecture rather than observation. I will return to this point at the end of this chapter. Furthermore, the essence-based interpretation is not really economical in that it makes it particularly awkward to explain social change. Some people become shamans or priests who were previously not identified as such; more embarrassingly, holders of religious offices are sometimes stripped of their legitimacy. Under the criteria-based interpretation, such cases can be readily explained as the acquisition or loss of certain characteristics that define the social categories in question. If, however, positions are interpreted as essence-based, the interpretation is much more costly in terms of additional hypotheses. One must either think of the underlying essences as something unstable, which is slightly paradoxical and adds to the number of facts to explain, or alternatively, some groups choose to consider that the person who lost his or her office in fact was not legitimate to start with. The change of status is then interpreted as the correction of a mistake.

We are therefore dealing here with a type of interpretation that is expensive in terms of explanatory needs, is of course not supported by the actual environment any more than the alternative, and yet seems more salient than the alternative to many human groups. This prevalence of "natural" explanations therefore needs to be accounted for. It constitutes one of these recurring features that should be explained by our cognitive framework.

Intuitive Knowledge and Social Cognition

In chapter 4, I mentioned the fact that intuitive biology, from an early stage of cognitive development, presumes a set of theoretical principles concerning the identity and properties of salient categories of living kinds. These intuitive principles state that certain living kinds can be construed as the manifestation of underlying similarities. External features are conceived as a consequence of these underlying traits, a consequence that is neither necessary nor sufficient for membership in the kind considered. Furthermore, there seem to be complex hypotheses about the type of features that can be expected from a given

being, as a consequence of its inclusion in a living kind. Typically, intuitive biological principles focus on the "innards" of living beings as the structural principles that cause external resemblance between members of a living kind. Such conceptions support the child's fairly robust views on the stability of kind-identity on the basis that changes from one category to another are not to be expected in natural situations. They also make it possible to interpret recategorization as the correction of a former mistake, rather than a change in the object itself. To sum up, it is obvious that "essence-based" principles are cognitively present, and salient, in conceptual structures that are under-determined by cultural tuition. The basic principles that organize notions of essence and kind make it possible to acquire vastly different repertoires of ideas about particular kinds and their behavior. It remains to be understood how essentialistic principles and particular assumptions about social categories are connected.

Social Essentialism Or Biological Metaphors?

The notion of conventional metaphor may seem the simplest way of describing the connection between biological intuitions and social categories. Conventional metaphors are not "live," poetic figures; at the same time, however, they

are not taken literally. Their use does not entail the beliefs they seem to imply (Lakoff and Johnson 1980; Lakoff 1987). An illustration is the English way of talking about luck; although common phrases convey the idea that luck is a fluid or substance that some people possess ("I don't have much luck"), a scarce commodity ("some people have all the luck"), or a personified agency ("luck was not with me today") (Keesing 1985,209), the corresponding beliefs or conceptions are clearly not there. The anthropological relevance of this approach has been underlined by Keesing (1984, 1985, 1990) on the classical case of the Melanesian and Polynesian notion of *mana*. Keesing shows that it is possible to analyze such seemingly "mystical" notions in terms of conventional metaphors of efficacy. These do not necessarily imply a "cultural metaphysics" any more than English speakers are committed to a metaphysics of luck.

In this conception, social essence-based concepts could be understood as based on an implicit conventional metaphor to the effect that SOCIAL GROUPS ARE LIKE SPECIES, formally similar to G. Lakoff and M. Johnson's famous. examples, such as TIME IS A RESOURCE OR INTELLECTUAL

ARGUMENT IS WAR. At first sight, this may seem plausible. Biological metaphors for social groups are a recurrent feature in many different cultural environments. This interpretation in terms of metaphors, however, poses some difficult problems. We saw in chapter 2 that models of symbolism based on the notion of metaphor are themselves often metaphorical, and this applies to the "conventional metaphor" approach as well. The Fang case, described above, constitutes a good illustration of this point. The Fang concept BEYEM can be understood as based on the assumption of an unobservable underlying feature. We could therefore suppose that it is represented as "species-like" in an implicit conventional metaphor. However, the Fang happen to have other social groups that are explicitly called "species." These are the exogamous lineages; the term used to designate those units (*ayong*) usually means "species" and denotes such basic genera as DOG, PIG, ANTELOPE, and so on. People sometimes use this conventional metaphor to express and "explain" the supposedly wide variation in mentality and behavior between different lineages. The analogy, however, is obviously an unfortunate and unproductive choice in this case, since the clans are exogamous and never assumed to share an underlying essence. In other words, one can have a conventional metaphor without essentialist assumptions, and conversely (in the case of BEYEM) have essentialist assumptions without an explicit metaphorical construction. The conventional metaphor model cannot distinguish between these cases, which are obviously different in terms of mental representations.2 More generally, the problem with such frameworks is that describing a conceptual structure as "metaphorical" does not give us any insight into the cognitive processes of acquisition and representation.

In more precise terms, one could conjecture that essentialist assumptions in social categories result from an *analogical mapping* of intuitive biology. In order to evaluate to what extent this is pertinent, it may be of help to reformulate in a more precise way the principles underlying the essentialist understandings. The fundamental notion on which all essentialist understandings are based is, obviously, the assumption that an essence exists. That is to say, the principle states that:

1.Observable similarity between members of category C is an index of (undefined) underlying similarity.

2. This example and the questions it raises concerning the applicability of conventional metaphor models to religious notions in general are developed in more detail in Boyer 1993b.

Now this principle is usually combined, in either social categories or understandings of living kinds, with another one concerning the causal relations between surface features and underlying similarity:

2.Observable similarity is a consequence of underlying essence; underlying essence is not caused by superficial features.

These two principles are usually combined with two other assumptions, which in fact can be taken as practical, though not logical, consequences of the former two. These assumptions could be called principle of metaphysical determinacy and principle of epistemic indeterminacy:

3.Any object either does or does not possess the underlying trait (no intermediary cases).

4.Since underlying traits cannot be observed, identification of any object as an exemplar of a category C is always corrigible.

These principles, taken together, constitute the basis of what I called the "essentialist" understanding of categories. They can be observed in people's representations of certain social categories, of certain living kinds, and perhaps of other types of categories.

In the domains where they are used, such principles are invariably combined with a host of additional domain-specific assumptions, which orient their application to empirical situations. The domain of intuitive biology for instance includes two sets of principles beyond these. A first series focuses on the structure of taxonomies; it states, among many other things, that living kinds at the level of basic genera correspond to *exclusive* essences (an object cannot be both a cat and a dog) and that such essence-based categories exhaust the domain of living things (Atran 1990, 47-80). Furthermore, it postulates that the formal requirements of taxonomic ranking apply to living kinds. A second series of principles focuses on intuitive explanations for the possession of a certain essence. For instance, they state that biological essences are linked to an exemplars' origin (only things born of cats are cats). Neither of these series of principles necessarily applies to the social categories mentioned above. In other words, if there is an analogical mapping, it involves only some of the principles of intuitive biology. This in fact is the very definition of analogical mappings, which constitute partial projections of a conceptual structure onto another.

Social Categories as a Domain

There are two ways of interpreting social essentialism. One is to assume that it is constructed, as described above, by a partial mapping of the principles of intuitive biology. This seems to me the most plausible hypothesis as regards the particular religious categories described here. There is, however, another possible interpretation, in which the domain of social categories is itself a domain of intuitive knowledge, some principles of which happen to be congruent with intuitive biological principles. If this were the case, there would be no mapping at all, the domain of social cognition being organized by its own intuitive principles. The choice between these interpretations is not purely academic. The question of whether specific cognitive mechanisms are applied to social processes and entities is the focus of important debates in social psychology, and to some extent in cognitive psychology. If social cognition is a special domain of cognition, then we must describe the specific processes whereby social understandings are created and transmitted. If, on the other hand, social understandings do not correspond to specific mechanisms, then we must describe which cognitive structures are used in the social domain and give social categories their cohesiveness.

In a series of recent papers, L. Hirschfeld has put forward a sophisticated cognitive account of social concept acquisition (1986, 1988, 1989) that makes it possible to formulate in more precise terms the choice between the mapping and specificity hypotheses. Hirschfeld is skeptical about the former, pointing out, quite rightly, that one should not take the recurrence of biological metaphors as sufficient evidence for an underlying mapping of biological assumptions. The experimental studies focus on two domains of social categories, that of kinship terms and that of racial categories.

In his studies on the acquisition of kinship terms (1986, 1989), Hirschfeld questions two general assumptions of the psychological and anthropological literature in the domain, namely that the acquisition is a data-driven inductive process, whereby children generalize from observable features, and that it is based on general inductive heuristics, similar to those found in other conceptual domains (1989, 549). Against this, it is possible to show that experience under-determines important aspects of kinship categories, and that their acquisition involves domain-specific processes. At the early stages of concept-acquisition, the child seems to take into account, as particularly salient, only certain dimen-

sions of the adult categories. Children's correct usage of certain terms, as well as their typical mistakes (such as overextension), make manifest which dimensions are spontaneously expected from kinship categories. Children take as highly salient criteria such as gender, relative generation, and membership in a relatively stable group (which may be called a "family" for lack of a better term). This latter assumption results from the fact that "young children conceptualize

humans as living in and inter-related within certain highly salient collections" (ibid., 565). Kin terms are interpreted as designating relative positions in such putative groups. The implicit assumption of a demarcated group is particularly interesting, in that it is under-determined by experience. An empiricist interpretation would predict that the concept of family is abstracted from experiential features, such as co-residence. This, however, is not the case; children do not strictly assimilate kin groups to residential groupings, even in cultural environments where residence is one of the salient aspects of "families." It is not the experience of co-residence which gives rise to the conceptual structure for family but the concept of a particularly salient grouping that makes it possible to represent co-residence as an indirect consequence and a typical feature of kin ties.3 Hirschfeid concludes that "the child must be spontaneously disposed not only to believe certain things about humans as individuals... but certain things about humans in groups. Kinship terms represent a domain-specific conceptual array with innately guided unique conditions of acquisition and an enriched initial state" (ibid., 565).

The domain of race categories presents slightly different features. Hirschfeld's starting point is the hypothesis that "experience significantly under-determines both the knowledge and the attitudes the young child develops about races and ethnic groups, and is inconsistent with the pattern of that knowledge's development" (1988, 629). Hirschfeld conducted a series of complex experiments on young children's racial concepts in Paris. These studies involve both picture recognition tasks and recall of verbal narratives using the racial category terms. Without going into the experimental detail, we must examine some interesting and counterintuitive findings related to the connec-

3. This intuitive principle is particularly interesting in that it differs markedly from what is assumed in other domains of concept-acquisition. As Hirschfeld points out, concept-acquisition is generally based on the assumption of context-insensitive identities. Children invariably (and rightly) assume that cats and telephones do not change identity with context. Co-residence, however, is a contextual feature that is used as indirect evidence for the applicability of kinship terms.

tions between perceptual features and category labels. On the one hand, the results confirm the well-documented fact that four year olds have an elementary but substantially accurate recognition of the perceptual stereotypes associated with socially salient racial terms. On the other hand, this information is sometimes not used by children, for instance in story-recall tasks concerning various racially identified characters, even after a priming task that used racial categories.4 In other words, some perceptual information is encoded as linked to racial labels, but it is difficult for children to activate this information and decide which features to use in recall. The domain of racial categories is particularly interesting because the adult concepts are systematically connected to perceptual stereotypes. If cognitive development were essentially driven by experience, the children would acquire the racial terms as simple labels for those stereotypes. Hirschfeld's experiments show that they are creating a slightly more complex conceptual structure. At an early stage of the acquisition of racial concepts, the child's expectations seem to be based on the assumption that membership in one of the racial categories should have *some* consequences for physical appearance, even in cases where it is not clear exactly what appearance should be expected.

Hirschfeld interprets both series of studies as showing the insufficiency of a mapping hypothesis: there is no borrowing from biology; instead there is a disposition to confuse distinct domains. The results, however, are more ambiguous; in my view, they do not support this general claim. While the domain of kinship seems indeed organized by intuitive domain-specific principles, the race categories seem clearly constructed, at least in their early formulations, on essentialist principles. The child assumes that there is something shared by all individuals included in a given racial category, even if the observable consequences of this similarity are not clearly represented. One domain of social categories seems to support the domain-specific hypothesis, and the other could be interpreted as a case of mapping from biology. This implies that the representations involved are likely to be very different, and consequently the acquisition processes to be different as well.

These contrasted results are paradoxical only if we want to maintain that social categories really constitute a unified domain. But the experimental studies seem to show precisely the opposite, namely that social cognition constitutes a conceptual motley in which diverse sets of cat-

4. This is a very simplified account of Hirschfeld's complex series of experiments. I mention only the results concerning four year olds, who contrary to three year old subjects, seem to have acquired and mastered the main

socially relevant racial categories.

egories are acquired and represented in very different ways. This is even more salient if our notion of social categories is broadened to include any concept that entails specific expectations from a particular group of people. In this case, there does not seem to be a clear set of principles that could be said to organize the domain of social entities and relations, for example, kinship, race, status, occupation, and so on. As E. Turiel puts it, social concepts are obviously not "all of one kind" (1983, 33); "development within a domain entails reorganizations of thought, so that separate developmental sequences can be identified for each domain" (ibid., 20).

Consequences of Essentialism

The psychological hypotheses and findings summarized here make it possible to formulate in more precise terms a general hypothesis concerning the essence-based interpretation of certain social categories. In this section I will try to show how this interpretation accounts for certain features of the religious categories we are concerned with. The fact that a category is represented as essence-based has certain consequences for the conceptual structures built around the verbal label, the specific expectations concerning the groups delineated, and the way the categories are acquired.

Specific Causal Powers

In very general terms, one of the important consequences of assuming that a given category is essence-based is that this interpretation strengthens all the assumptions concerning specific causal potential. In other words, given certain conditions, it is expected that members of the category will behave in a different way from nonmembers. Notice that it is of course possible to entertain such expectations about all types of categories, essence-based or not. As I pointed out in chapter 5, there is a strong connection between taxonomical hypotheses and causal expectations. The difference here is that essentialist hypotheses make such expectations more salient. Subjects can entertain them, and add them to the nonschematic part of the conceptual structure, without representing their connection to the other typical features of the kind. This is obvious in living kinds, for which expectations of causal stability go much further

than what intuitive biology would support, in strict deductive terms.5 Another interesting feature of these expectations is that they can be entertained, as a result of limited experience or direct communication, without representing their connection with the underlying essence. Subjects generalize about the probable behavior of a given species without any explanation as to why members of a same species can be expected to display a similar behavior; this "meta-principle" is simply postulated.

A similar over-extension of causal expectations can be observed in the representation of social "essences." Causal features, obviously, provide the main identification criteria for religious positions. People who have a given religious role are supposed to have special capacities, and by manifesting those capacities confirm that they are genuine exemplars of the category. Again, this might be said of many social categories that are not essence-based. The difference is that an essentialist understanding makes these causal expectations relevant, even if one has no theoretical principle to account for them. To return to the Fang example, the *ngengang* are construed as being able to perform certain rituals in which the ghosts are contacted and, in many cases, provide remedies for a case of misfortune. There are of course some widespread assumptions about what makes the *beyem* in general, and by implication the *ngengang*, different from other people; these vague assumptions focus on the invisible organ called *evur*. There is, however, very little theorizing about the reasons why *evur* makes it possible to perform the rituals in question.

Furthermore, causal expectations are typically not limited to such characteristic features. People for instance notice other regularities or pseudo-regularities, concerning for instance the way *ngengang* typically talk or dress, although these are not related in any way to their capacities. Again, a comparison with biological species shows how this is a consequence of essentialist hypotheses. To express things in philosophical terms, one expects living kinds to display "bundled features." Subjects expect members of a living kind to display similarities in indefinitely many aspects beyond those

which are directly characteristic of the spe-

5. For instance, it is expected of the members of a given animal species that they will react to a similar situation (e.g., being presented with an exemplar of another species x) in a roughly similar way. It is also expected of members of a given species of plants that they will change as a result of specific manipulations (e.g., being sprinkled with a given liquid) in similar ways. These expectations, which are not invariably confirmed by experience, go further than intuitive biological principles entail. Yet they are spontaneously entertained for the categories that are represented as essence-based, typically at the genetic level.

cies. This extension of possible generalizations shows how an essentialist understanding strengthens causal expectations.

These aspects of the understanding of the category are not possible in the absence of the essentialist assumptions. If for instance *ngengang* are construed as simply people who have acquired certain ritual recipes, then nothing special follows as far as other traits of behavior or external appearance are concerned. A criteria-based understanding of a category implies that nothing in particular should be expected from the members of the category beyond those features which are direct consequences of the characteristic ones. This point is particularly important if we bear in mind that, as I suggested above, there may exist coexisting (and sometimes competing) understandings for the same social categories. An established church is more or less inevitably led to emphasize a criteria-based understanding of religious offices, which affords better control of the officeholders. The remarkable fact that congregations often tend to distort such understandings and re-create essentialist understandings where they were officially excluded may be in part a consequence of this causal mechanism. The essence-based interpretation makes the representation of religious capacities much more salient, by making it possible to represent the specific powers of certain people without a schematized understanding of how these powers come about.

Acquisition, Ostension, and Induction

This description leads to another, fundamental consequence of essentialist understandings, which has to do with the way subjects *arquire* the concepts designating social categories. The fact that natural kinds display bundled features implies that the categories can be acquired, at least theoretically, by simple ostensive designation. Obviously, ostension under-determines both the extension and the logical status of the designator, as many philosophers have pointed out, notably Quine (1969). From a gesture pointing at a cat and the word "cat," it is not possible to deduce that the utterance comprises a kind-term, rather than a demonstrative, a property-term, or any other type of word. Human subjects, however, manage to interpret such designations successfully on the basis of nondemonstrative inferences instead of logical deduction. Basic terms for living kinds for instance are acquired early, and almost entirely by generalizing from ostensive designations; children have no difficulty in overcoming the indeterminacy of osten-

sion.6 The tacit principles of intuitive biology make the expectation of underlying resemblance, and therefore the usage of a lexeme to designate it, particularly salient. To put things simply, if one already has a concept (however unsophisticated) of TYPE OF ANIMATE OBJECTS, the acquisition of "cat" as a name for a species consists in filling a lexical slot in a conceptual structure, rather than acquiring the conceptual structure itself. The intuitive presumptions about what kinds are like provide the background for understanding ostensive designations. They also make instance-based generalizations possible.

Children acquire a wealth of social categories, including religious social categories, long before they have accessible "models," with lists of characteristics, for those categories. Obviously, the acquisition of social categories is different from that of biological terms in the sense that perceptual similarity plays a minor role in categorization, particularly in the religious domain. It is remarkable, however, that many social categories, including salient religious social categories, are acquired by simple ostensive presentation. This does not imply that children are actually able to identify the real extension of the set. On the contrary, they typically make identification errors. However fragmentary, these representations are available, and are used in children's utterances, without the need for tuition or communication of some

defining "model" for the social category.

The acquisition of social categories presents an interesting difference with the biological domain, as regards instance-based generalizations. As I pointed out in chapter 4, young children have no difficulty in projecting *certain* aspects of observed instances onto the kind as a whole. The choice of projectible predicates, which is not always congruent with biological reality, results from intuitive assumptions about what features are more central to the identity of a kind. In contrast, children who acquire social categories typically make extensive generalizations that cover most observable characteristics of the instances presented. This is why, from the adult's viewpoint, children seem to have a very vague or inaccurate understanding of the social category. They do not identify which features are characteristic of the set and which are accidental. The adult, however, has access to assumptions that make only some features salient for identification. For instance, as L. T. Semaj points out (1980), Western children attribute the same stability to most aspects of social

6. See Markman and Wachtel 1988 for an experimental demonstration of this effect in young children.

identity. They consider for instance that occupation, like race or gender, is a stable characteristic of individuals.

This difference is important, because it is not always canceled out by the acquisition of later, explicit notions concerning the social categories. In the acquisition of a model for BANKER, or VICAR, subjects obviously learn to discard features such as OLD AGE or POMPOUS VOICE as characteristic of the category, however frequently they are displayed by actual exemplars. In the domain of religious categories, however, this process of selection of features is much less clear. To return to the example of the Fang category NGENGANG, subjects have a clear understanding that certain activities, notably certain types of ritual performance, are characteristic of the category. This does not stop them, however, from using many other features as potential material for generalizations. Indeed, any feature that may highlight the special nature of the *ngengang's* activities is noticed and commented upon. For instance, in a group where I worked, the fact that one *ngengang* was particularly slovenly and that he did not weed his plantations as often as other people, was taken as further corroboration of the fact that he really was a *ngengang*. There were, obviously, some abductive justifications for the connection. In other groups where *ngengang* were neither slovenly nor negligent, other traits were selected. In other words, such features do not constitute evidence from which identification could be deduced. On the contrary, subjects use whatever features can be found in order to make a generalizing conjecture that would strengthen the prior identification. Such indiscriminate generalizations are the consequence of (1) the essentialist principles, which state that observable features are caused by the underlying trait, and (2) the absence of schematic theoretical principles to constrain the selection of features.

Essence-Based Assumptions and Uncertainty

In the classical interpretation, social categories are said to be represented as criteria-based concepts. Ira category is understood as criteria-based, then it should be equally easy for subjects to have access to (1) whether a given person is or is not a member of the category, and (2) what facts make him or her a member or not a member. Ira category is essence-based, on the other hand, these two aspects are strikingly different. The fact that a given animal is a Dog can be accessed without difficulty; however, the facts that make it a member of this category are

generally not easy to elicit, and in fact are not represented by most subjects, except some biologists. In this case, the identification can be made on the basis of indirect indices (e.g., outward appearance) without having access to a theory that would justify the connection between these indices and the identification. If we can find a parallel situation in the identification of religious social categories, this should support the hypothesis that they are indeed represented as essence-based. The anthropological data, as far as they can be used as indirect evidence for cognitive processes, seem to support the prediction.

Let me mention briefly two examples that will illustrate the vagueness and the variability of those assumptions. In his account of Berber tribes, E. Gellner (1969) describes at length the processes of consensus building whereby a group is

gradually led to identify certain persons as bearers of *baraka*. Grace is a personal quality, and religious office as a local "saint" is construed as consequence of that quality. There is no doubt that any given person either has or else has not received this God-given quality. In the local assumptions about *baraka*, there is more than a hint of a biological interpretation. For instance, it is assumed that the saints are always the descendants of Other saints, and ultimately of the Prophet himself. Local theories of transmission, however, are extremely vague and are made even vaguer by certain interaction constraints that make a straightforward biological metaphor difficult to maintain. For instance, the interaction between tribes and saints imposes strong limitations on the number of active saints in any area. As a consequence, it is often necessary to determine which descendants of a saint have inherited his *baraka* and which have not (Gellner 1969, 142ff.). The problem of course if that this latter assumption is not altogether compatible with the quasi-biological assumptions. It is not surprising, therefore, that the discrimination is construed as God's choice and is not the object of much theoretical speculation. People can perfectly maintain the notion that grace is a yes/no matter of fact, and that it can be inferred from observable features, without a clear understanding of why that matter of fact should result in those features.

A consequence of this vagueness is that rival interpretations of the connection can coexist, in groups that share some basic premises about a given religious category. K. Endicott for instance (1979) describes two closely related groups of aboriginal hunters in Malaysia, the Lebir Batek and Aring Batek, which have the same religious category of SHAMAN (*hala*'), with the same notions of their capacities. They nonetheless seem to have divergent interpretations of some consequences of membership

in the category: "according to the Lebir Batek, any person who has sufficient ability and interest can become a shaman. To do so, he must learn shamanistic songs and spells and must acquire the clear blood of *the hala*' The Aring Batek, on the other hand, believe that only persons who are descended from shamans have the potential to become shamans themselves" (ibid., 134). This contrast results in different burial customs. The Lebir Batek handle the shaman's body like other corpses and give him an ordinary burial. Although the shaman's death is construed as voluntary, his destiny is the same as that of other people. His soul is supposed to be incarnated in several new bodies, just like the soul-shadow of any normal person. For the Aring Batek, on the contrary, the death of the shaman is in fact inconceivable. Shamans do not die, they only withdraw temporarily from the world of the living. Their bodies are not buried; they are left in their huts. The other members of the group leave the camp, and after a while the body is supposed to turn into that of a tiger (ibid., 137). Thus, the essentialist understanding of a category can either be limited to the assumptions concerning kind-identity or be enriched with further assumptions about the connections between underlying trait and observed features.

Schematism and Culturally Specific Assumptions

The hypothesis presented here goes against some common anthropological and sociological assumptions concerning the representation of social positions in general. The classical paradigm may be summed up as based on three main assumptions:

1.There exist shared cultural models that provide definitions for the salient social categories.

2.These models typically include specific capacities, or rights to perform specific actions, as the criteria for membership in the category.

3.The acquisition of the cultural models is experience driven. The regularities provided by the social world are sufficient to account for the mental representation of social categories.

Against these assumptions, I would claim that at least *some* social categories are represented in ways that do not conform to those three

assumptions. The hypothesis of social essentialism states that in such cases:

1.Whatever is "shared" (i.e., whatever assumptions are distributed, in a relatively similar form, among a population) is not sufficient to determine the extension of the social categories.

2.The assumptions concerning capacities and actions are not criteria, since they are neither necessary nor Sufficient for membership.

3.Features derived from experience under-determine the conceptual structures that correspond to labeled social categories.

The categories are conceived here as complex structures of assumptions in which some principles derived from intuitive theories, notably from intuitive biology, are combined with other assumptions concerning the particular features of the categories in question. Some of the tacit principles that organize these categories and govern people's expectations are not derived from cultural material. These principles are spontaneously put forward by subjects as the optimal way of understanding the existence of social category labels and their connection with observable features.

If the essentialist interpretation is correct, the representation of these social categories would be described as consisting of(1) schematic causal assumptions derived from essentialism and (2) nonschematic characteristics that give the categories their particular social content. In other words, what constrains these categories, what makes it possible to limit the range of possible beliefs about their referents, would be not the social characteristics that are accessible to the subjects but only the set of tacit principles of essentialism. This would have the interesting, if somewhat counterintuitive, consequence that these social categories are made cohesive and support coherent expectations by virtue of assumptions that are not limited to the social world, and in fact are developed to a much greater degree in nonsocial domains. This leads to a straightforward interpretation of the acquisition and recurrence of social religious categories. The recurrent elements, as I tried to show here, stem from the essentialist understanding of the categories. Once they are understood as essence-based, it is possible for subjects to bring together a series of instance-based inductive generalizations and inferences from tuition, which provide the local "cultural" content of the categories. Such local elaborations are made possible and constrained in both their content and their inferential potential by spontaneous ontological premises.

7
Ritual Episodes and Religious Assumptions

The "episode" repertoire includes mental representations that make it possible to categorize and recognize particular types of religious action or interaction. Religious assumptions may be associated with indefinitely many different types of social situations, so that the category of "religious episodes" lumps together situations that have no causally relevant properties in common. This is why I will focus on a particular subset, that of *ritualized* religious episodes, which is remarkable in terms of cross-cultural recurrence. In most human groups, one can find a repertoire of categories designating particular types of ritual actions. These do not exhaust the set of religious episodes, but they often constitute the most salient types. The point of this chapter is to describe the set of assumptions whereby particular ritual actions are identified, that is, the mental representations that make it possible to connect the categories and the actions they are supposed to denote.

The domain of religious ritual is particularly complex, and it could be approached from indefinitely many angles. In this chapter I do not propose to give a new "theory of religious ritual"; indeed, one of the main points of the argument is that there is no unified set of phenomena that could be the object of such a theory. Rather, I will focus on an aspect that is crucial for a cognitive description of religious representations, particularly for a cognitive understanding of religious transmission. I will consider the connections established between representations of ritual action, on the one hand, and other types of religious assumptions, on

the other. This domain, which could be glossed roughly as that of the "meaning" of religious ritual, is often approached in

vague and misleading terms. A more precise description of the cognitive processes underlying the representation of ritual action types is required.

Cognitive processes of categorization and identification must be described if we want to understand two major aspects of religious ritual. First, ritual episodes are obviously crucial to the acquisition and transmission of religious representations. They provide situations that constitute, modify, or strengthen the subjects' religious representations. Second, specific episodes are often viewed by the participants as *evidence* for religious assumptions, notably as the apparent confirmation of ontological assumptions. These are two aspects of the same process, and both depend on categorization and recognition. The fact that rituals have certain effects, and are felt by participants to have a certain epistemic status, obviously depends on the way these religious episodes are identified and recognized as belonging to particular types.

Ritual and Theories of Ritual

Before turning to the psychological aspects of the representation of action, we must face the familiar definitional problems that beset the notion of "religious ritual." There are many anthropological "definitions" of ritual and many discussions about their respective merits (see Goody 1961; Lawson and McCauley 1990 for a review). One can apply to these debates the remarks made in chapter 2, that definitional disputes are generally sterile and too often rely on an exaggerated notion of what definitions are for. Before trying to "define" ritual, one should specify what purposes this kind of definition is supposed to serve. It cannot be to delimit a set of phenomena, that is, to propose empirical criteria that would make it possible to sort out rituals from other types of social interaction. By and large, most anthropologists agree on the reference of the term "ritual," on which series of actions constitute rituals and which do not, though the distinction has a fuzzy borderline as in all such distinctions. The function of a "definition" is therefore to point to the particular aspects a given theory proposes to explain. To take but two examples, consider the following characterizations. S. J. Tambiah, in a general essay on the "performative" nature of ritual actions, states that ritual should be defined as "a culturally constructed system

of symbolic communication... constituted of patterned and ordered sequences of words and acts, often expressed in multiple media, whose content and arrangement are characterized in varying degree by formality (conventionality), stereotypy (rigidity), condensation (fusion) and redundancy (repetition)" (1981, 119). In the introduction to his detailed study of Sinhalese exorcism, B. Kapferer characterizes ritual as "a multi-modal symbolic form, the practice of which is marked off (usually spatially and temporally) from, or within, the routine of everyday life, and which has specified, in advance of its enactment, a particular sequential ordering of acts, utterances and events, which are essential to the recognition of the ritual by cultural members as being representative of a specific cultural type" (1983, 2). These, surely, are not merely definitions in the strict sense; they point to particular aspects of ritual and particular ways of approaching them. Such research programs can neither be true nor false since they are prescriptive rather than descriptive; however, they may be more or less felicitous.

On the whole, anthropologists tend to be skeptical about the heuristic value of these various definitions or programs found in anthropological theory. Anthropological characterizations are either hopelessly vague, and therefore trivially true but unproductive, or else more precise and consequently refuted by many counterexamples. This prompted R. Needham to argue that the category RITUAL, like other anthropological concepts, is "polythetic": it corresponds to a family resemblance rather than a set of common features (1985). In this view, although many rituals share many of the features we intuitively associate with the prototype, there is not a single feature that could be said to be true of all such social situations. Although Needham's "polythetic" interpretation is not really satisfactory, his argument points to the real problem with anthropological definitions of ritual, namely a central confusion about the kind of commonalities that can be found in ritual. The idea of a "polythetic" class, in Needham's usage, is ambiguous; it could mean either that the objects put together do not have a single distinctive property in common, or that our understanding of the category is based on a prototype (a family resemblance) rather than a distinctive property. These are not equivalent; as I indicated in chapters 3 and 6, there are many examples of categories the instances of which are identified by using a prototype, but which nevertheless denote well-demarcated sets of objects. We generally recognize giraffes on the basis of a (perceptual) prototype; there is no doubt, however, that the set of giraffes has definite (nonfuzzy) boundaries, so that no being can be "half giraffe" or "giraffe

to a certain extent." Some aspects of this, as we will see, are pertinent to the general characterization of ritual and consequently of the subcategory of religious ritual.

Ritual Behaviors and Ritual Situations

The starting point of any investigation into ritual is an *intuitive discrimination* of behavior. Whether anthropologically trained or not, we observe that certain acts, gestures, utterances, and so on seem to be of a particular mode, which sets them off from acts performed in other contexts or situations. Obviously, this intuitive demarcation may sometimes be uncertain; also, observers may sometimes have different intuitions about a particular situation. These problems should not be taken as evidence that the intuition has no referential basis. The identification of rare or atypical animals may sometimes be problematic; this in itself does not disprove the assumption that they must belong to one and only one species. So let us assume, for the sake of argument, that there is a fact of the matter to the distinction; it is indeed based on some actual property of the acts, utterances, and so on in question. Now the problem is to decide which direction the investigation should take. My contention is that, at this point, anthropological models generally take the wrong turn, as it were, and end up in an impasse, in which the features of a type of behavior and those of the situations in which it is used are assumed to be necessarily related. I will argue that there may well be a distinctive form of behavior in ritual, but this does not entail that there will be significant similarities in the types of situations that are associated with this type of behavior. These two questions should not be lumped together in a question-begging characterization of ritual.

This simple distinction will be clearer if we consider another mode of behavior that is apprehended intuitively. In most human groups, one can find some form or other of action that can be called "dancing." This is recognized intuitively (though not without occasional mistakes) in the sense that no one needs a definition of the category DANCING to identify this form of action in one's or other people's cultural environments. Defining or even characterizing DANCING in a nonvacuous way is particularly difficult. We could assume that the proper characterization of DANCING will be found by generalizing over the range of ideas, emotions, social uses, and so on of dancing in very different environments. This, however, would rapidly become a sterile and indeed absurd investiga-

tion. In some societies dancing is collective, elsewhere it is only done in isolation; it may be thought of as pleasurable here and painful there, or maybe embarrassing or compulsory or tedious. It may be an artistic performance or a religious act or just fun. There is nothing common to all these situations except, precisely, that dancing is used in all of them. So we must distinguish two elements here, a certain *behavioral modality* on the one hand (the stylized usage of distorted ordinary gestures in this case), and a set of situations in which it is used on the other. We should not presume that this latter set has any common feature other than the usage of the behavioral modality in question.

To return to ritual, we should be careful not to lump together, as the category "ritual" generally does, both the common behavioral aspects and the similarities in the various ideas, assumptions, and so on associated with them by the participants. This point will be particularly important, if ritual indeed constitutes a behavioral modality, in the sense given above. There are several reasons to think that ritual can be approached as a behavioral modality. First and foremost, as I said above, it is not difficult to have definite, stable, and shared intuitions about the ritual-ness of a given situation (whether such judgments are always right being another question). It is invariably on the basis of such intuitive recognition, not as a result of theoretical "definitions," that anthropologists in the field single out certain situations as rituals. Second, there are obvious similarities between situations labeled "ritual" in human and animal behavior. Without dwelling too much on this complex question, I posit that human rituals are generally recognized as such by virtue of features that apply to many types of animal displays as well. Stereotype, repetition, and the rigid sequencing of elementary actions are all aspects that make animal and human ritual structurally similar. Obviously, most anthropologists at this point would argue that there are crucial differences between animal and human ritual. However crucial, these differences are not really pertinent to the present argument, since they consist in aspects of the *representations* attached to rituals, not aspects of ritual behavior as such; for instance, human rituals are said to involve "symbols," to have "meaning," to realize various political strategies, and so on.

Ritual may constitute a simple, primitive behavior modality, intuitively contrasted with nonritual social interaction, in the same way as song is differentiated from speech or dance from gestures. What is meant here by "primitive" is that such

discriminations are yes/no intuitions founded on criteria that are rarely if ever available to the subjects and cannot be analyzed as a combination of simpler features. Alternatively,

one may assume that ritual constitutes a *complex* of such primitive behavioral modes. Bloch for instance (1974; 1989, 1945) emphasizes the recurrence of dance, song, and formulaic speech, pointing out that the presence of at least one of these aspects seems necessary for the intuitive recognition of ritual. In either case, primitive or complex, the ritual mode does constitute a form of behavior that can be studied as such, and the properties of which do not necessarily depend on the contexts in which it is used.

This distinction between ritual behavior as such on the one hand, and its various significations and consequences on the other, is the starting point of a seminal essay by R. Rappaport on the "obvious aspects of ritual," that is, on those aspects which are specific to the ritual form (1974; 1979, 173-221). Rappaport makes the simple point that analyses of ritual should begin by describing what is distinctive about it, rather than what makes it similar to other forms of social interaction. The communication of "meanings," the use of "symbols" and other such features, are, if pertinent, pertinent for cultural phenomena in general. As Fortes put it, "it is a short step from the notion of ritual as communication to the non-existence of ritual *per se*" (1966; cited by Rappaport 1979, 178). By focusing on such aspects as *formality* ("rituals tend to be stylized, repetitive, stereotyped" [ibid., 176]), Rappaport tries to uncover these aspects which "lead us to identify events as instances of ritual" rather than "ritual's dark symbolic or functional depths" (ibid., I73-174).

One can therefore distinguish between two possible objects of a "theory of ritual." In the anthropological literature, the term generally denotes an attempt to list and explain the general properties of the interaction situations in which rituals are used. Yet a "theory of ritual" could be a general account of the processes, cognitive and otherwise, whereby the ritual mode is triggered and directs action or interaction. This ethological and cognitive account, however indispensable to any general reflection on rituals, simply does not exist in the anthropological literature, though it may well be the indispensable foundation of a proper understanding of ritual situations.

This distinction makes it possible to understand both the justification for Needham's skepticism as well as the problem with his notion of a "polythetic" class RITUAL. Needham is quite right to point out that anthropological "definitions" of ritual are generally vacuous. This does not entail, however, that there are no common properties in all instances of ritual behavior. It only indicates that such instances can be *recognized*

without using these common properties. If the category denotes a genuine kind of behavior, RITUAL is very much like GIRAFFE, a natural category denoting a genuine ("monothetic") kind, and the question, Which genuine features are common to all instances? is a matter of empirical investigation. What makes anthropological definitions confusing is that they often reformulate an intuition about the ritual behaviors, as though it were an observation concerning ritual situations. As far as this latter object is concerned, Needham may well be right in assuming that they have no single property in common and display only some form of family resemblance.

The Problem: Selective Aspects Of Ritual Situations

Ritual situations do not seem to display any universals beyond the use of the ritual behavioral mode. There may well be, however, recurrent properties of ritual situations that a cognitive approach to religious ritual should describe and explain. That no satisfactory description or explanation of these recurrent properties can be found in anthropological theory may be a consequence of the preference for *generative* models, as opposed to *selective* ones. Theories of ritual, particularly of religious ritual, often seem to stem from a generative approach. For instance, it is assumed that religious representations have certain properties or features, such that they will lead people to perform "stereotypic," "prescribed" actions. In this case the features of religious representations are taken as the cause of particular features of the behavioral mode. Conversely, it is sometimes assumed that ritual actions have certain features, such as being "stylized" and "prescriptive" for instance, that will give rise to certain types of religious understandings. In this case features of religious representations are the consequence of features of the behavioral mode. In both cases, the causal mechanisms involved are assumed to be of the generative type. This, I would argue, is one of the factors that lead anthropological accounts of

ritual to misconstrue general features of ritual behavior and general features of ritual situations as one and the same object.

It is possible, at least in a speculative manner, to rephrase the question in terms of a selective approach. In this conception, ritual is seen as a behavioral modality, available to humans as it is to other species, and in that respect comparable to fighting, fleeing, and other types of intuitively identified behavioral modes. This modality (or particular combination

of modalities) is intuitively recognizable by human subjects, although they do not necessarily have the conceptual structures that could justify the intuition. Again, one can easily recognize situations of aggression and flight, without being able to represent explicitly the similarities between these situations. The cognitive means whereby such intuitive distinctions are operated are not necessarily penetrable by conscious cognitive activity.

The main question, then, is to ask what types of mental representations and forms of interaction are particularly likely to be attached to the ritual mode, given its behavioral characteristics. The assumption is that the ritual mode probably has properties that make it likely that its use will be recurrent in certain types of interaction situations and will be associated with certain recurrent types of mental representations. There is no deterministic link here, only a probabilistic one. The features of the behavioral mode have effects on the likelihood that certain types of representations will be activated, as opposed to other types.

Adopting a selective approach also implies that we do not need to waste time on the distinction between religious ritual and other types of ritual (e.g., "secular"). For the purpose of the present discussion, religious rituals will be understood as any rituals the identification of which makes it necessary to activate religious assumptions. Since the choice of assumptions activated is neither a cause nor a consequence of the ritual mode itself, there is no reason why differences in assumptions activated should be directly reflected in differences between ritual structures. The distinction between religious and nonreligious ritual is a simple by-product of that between religious and nonreligious representations; it is adopted here for the same heuristic reasons, and with as little commitment to its ontological significance, as the distinction discussed in chapter 2.

In the rest of this chapter I will explore some particular features of the mental representation of ritual actions. In order to perform rituals, one must have particular representations of the ritual sequences themselves, of the series of acts that constitute an occurrence of the particular ritual action type. These representations, obviously, are at least in part constrained by the features of their object, namely occurrences of ritual behavior. This, as we shall see in the following sections, gives these action representations special characteristics, which in turn impose constraints (1) on the range of ontological and causal assumptions likely to be associated with ritual occurrences, and (2) on the connections perceived by the participants between such assumptions and ritual occurrences.

Ritual Sequences and Religious Assumptions

In most anthropological studies of religious ritual, it is assumed that the actions performed in such situations can be characterized by their cultural "meaning," by the range of significations the participants associate with their performance. This is of course more often than not expressed in remarkably vague terms, which give little indication as to what cognitive processes are supposed to underpin such "meanings." Indeed, the very notion of meaning, in such discussions, seems to be extremely ambiguous. In this section, I deal with the kinds of representations (mythical or otherwise) that people actually use in representing what happens in ritual situations.

The idea that rituals are "meaningful" is often combined or even confused with the idea that one can use rituals as a primary source of information about a group's religious assumptions. So a particular methodology (using ritual as a source of information about a religious system) goes hand in hand with a particular theoretical proposition (that religious rituals convey particular "meanings" to the participants). To a certain degree, the fact that an anthropologist can extract

"meaning" from particular ritual sequences seems sufficient evidence for the idea that meaning is there to be found. There are two difficulties, however, with this kind of reasoning. One is that the particular method, the use of rituals as evidence for religious representations, is not unproblematic. The other is that, even if the method were sound, it would not guarantee that the "meanings" extracted by anthropological analysis have anything to do with the representations actually entertained by the participants.

Let me first deal briefly with the question of method, which is of only marginal interest here. There is obviously a slightly paradoxical overtone in the use of ritual as a source of ethnographic information. In most cases, this usage is based on the idea that we can translate or rephrase series of actions as the expression of certain propositions about gods, spirits, and other such religious agencies, as well as about their relationship to ritual participants. In doing this, however, we have to ignore, at least provisionally, the fact that religious rituals are precisely rituals, not series of explicit statements. In other words, we tend to describe and analyze the rituals as if they did not consist of actions. To push the method to its extreme, we are led to analyze rituals as expressing religious statements *in spite of the* fact that they consist of actions. This should be enough to show that the notion of "meaningful actions" cannot be sufficient as

an anthropological description of religious ritual. For, even if the rituals did convey religious statements, it would remain to explain why these are couched in the ambiguous, indirect idiom of actions rather than directly stated.

To turn to the more important question of the participants' representations, the idea of rituals as "meaningful" is deeply problematic, despite the conveniently vague terms in which it is generally expressed. The idea could be taken (and is indeed taken) to express one or both of the following propositions:

1. Rituals are *expressive* in the sense that information is conveyed, though probably in an indirect form, through their performance.

2. There are "cultural models" or assumptions that provide explanations or justifications for the particular features of each type of religious ritual.

It is thus commonly assumed that participants in a ritual receive some kind of information or message from the features of the performance; conversely, one assumes that these features can generally be deduced from shared models or conceptual structures.1 Both propositions, however, generate difficult problems.

Ritual As Nonexpressive Behavior

The first idea, that rituals convey meanings to the participants, has to confront an immediate paradox. Rituals are generally recognized as such because of a particular combination of traits that make them a notably awkward channel for communication in general, and for the communication of propositions in particular. Bloch's description of Merina oratory (1974; 1989, 1945) constitutes a particularly lucid discussion of the problems facing the notion of "meaning" in ritual. Bloch points out that ritual actions are generally characterized by a stylization process, which in practice reduces the variability of the "messages" used. Rituals typically make use of standardized forms of speech, in which vocabulary, syntax, intonation, prosody, and so on are reduced to a limited repertoire, as opposed to the variety of expressive

1. The idea of ritual as "expressive" is defended most explicitly by J. Beattie (1970). An "intellectualist" version of the argument is presented by H. Penner (1985), and the classical "symbolist" perspective by Turner (1967, 1968).

choices offered in nonritual speech. In the same way, rituals make frequent use of dancing, that is, of a particular choice of gestures, much more limited than in other contexts. More generally, ritual situations can be characterized by the fact that they impose strong constraints on the choice and variability of actions and "symbols" used. Bloch then points out that if communication is understood in information-theoretical terms, then rituals are certainly not communicative. By reducing the variability of items used, they make each single item much more predictable, and therefore much poorer in

terms of information transmitted. If anything, rituals are characterized by the obstacles they put in the way of communication, rather than the expressive possibilities they offer. If one wants to classify social interaction contexts in terms of the richness of information conveyed, rituals are certainly nearer the non-expressive end of the continuum than most other types of situations.2 In a more radical way, F. Staal argues that rituals, inasmuch as they are ritualized, are necessarily "meaningless." They are a form of "activity governed by explicit rules" (Staal 1979, 4). Regulation by formal rules, comparable to syntactic or musical structures, is what constitutes the ritual and matters to the participants; belief, intention, and emotion are additional elements that are tagged onto the ritual structure, yet are neither necessary nor sufficient to characterize it.3 The idea that rituals convey "meanings" therefore seems to lead to the semiotic conception of symbolism rightly criticized by Sperber (see chapter 2). Against the idea of ritual as statements couched in actions rather than words, it is all too easy to show that ritual actions seem a particularly inappropriate way of conveying complex propositional messages. That rituals are "non-expressive" in the precise sense described above there is little doubt. Whether this constitutes an argument for their being "meaningless" is a moot point, and the category of "meaning" itself is much too vague to make the point worth discussing.

2. Bloch also contends, on the basis of the Merina case, that nonexpressiveness, and the concomitant reduction in the type of response the ritual is likely to trigger, may provide particularly adequate contexts for the imposition of traditional authority. See Boyer 1990, 79-90 for a discussion of this point, as well as a discussion of Bloch's arguments about the "reduced propositional content" of formalized speech. See also J. J. Fox 1988, and J. Sherzer and J. Woodbury I987 for a series of examples of ritualized speech.

3. In his argument, Staal sometimes oscillates between analytical considerations and the participants' viewpoint, in this case that of the Brahmins, who are notoriously fastidious in terms of precise execution of ritual gestures, and who regard belief and intention as secondary. For a more refined study of the notion that rituals are "meaningless" from the participants' own viewpoint, see C. Humphrey and J. Laidlaw 1993, whose ideas on ritual action and intention are also discussed below.

Rituals and Cultural Models: "Syntax" and "Semantics"

Let me now turn to the second proposition, following which shared cultural assumptions inform the structure of ritual action. This hypothesis could take two forms, one of which is true but trivial, while the other constitutes a strong, plausible, but not unproblematic hypothesis. In a vague way, it is certainly obvious that one cannot "understand" a ritual without knowing at least some elements of the religious assumptions held by the participants. One "understands" the Catholic mass somewhat better if one knows that the participants believe in an invisible omnipotent God, that they take moral law to be of divine origin, and so on. This fact, however, does not tell us how such representations are brought to bear on the participants' representations of their actions. All it tells us is that there is *some* connection between the assumptions entertained by various participants and the features of the rituals; this is certainly true but hardly informative.

In their general theory of the "syntax" of ritual action, Lawson and McCauley (1990) put forward a general framework in which the question of ritual "meaning" can be formulated in a more precise way. In direct analogy with linguistic competence, understood in a strictly Chomskyan sense, Lawson and McCauley argue that idealized participants in religious systems must represent some knowledge that allows them to have definite intuitions about the "well-formedness" of religious rituals. The authors start with a strict analytical distinction between the *semantics* of religious ritual systems (the various conceptual assumptions concerning the existence and properties of extra-natural entities) on the one hand, and the *syntax* of ritual action on the other. Actual ritual actions are the realization of abstract descriptions generated by a set of basic recursive rules, applied over a set of conceptual slots (such as AGENT, ACT, OBJECT). The action descriptions represent the competence underlying the participants' intuitions of well-formedness of specific rituals. Such action descriptions are not abstracted by inductive generalizations from actual actions, any more than syntactic structures can be uncovered by generalizing over actual utterances. This general approach is implemented in a specific theory of ritual action, which represents the core of the argument. Lawson and McCauley put forward a series of syntactic rules, some of which pertain to action descriptions in general, while others apply to the narrower domain of ritual actions.

I will not discuss here the specific proposals made by Lawson and McCauley about the universal "syntactic principles" of ritual, which are beyond the scope of this chapter. However, the competence framework presents a very clear discussion of the question of "meaning" in ritual, which can be of help in formulating our questions more precisely. According to Lawson and McCauley, the syntax of ritual action specifies a number of well-formed structures that connect such abstract elements as AGENT, OBJECT, ACT. These abstract slots constitute variables, the precise value of which, in each particular case, is specified by what they call the "religious conceptual scheme" particular to a group. Thus the fact that one of the [AGENT + ACT + OBJECT] sequences consists in, for example, "the priest consecrating the newly built church" or "the shaman slaying a goat," is specified by the conceptual scheme, while the position of that particular act in the ritual sequence is constrained by syntactic principles.

The hypotheses presented in the rest of this chapter differ from Lawson and McCauley's framework in two ways. First, competence theory, in religious matters as in linguistics, requires that we produce a description of the knowledge an ideal participant should possess in order to have definite intuitions of "well-formedness." The theory specifies this abstract competence before examining in what specific ways it is actually represented by the participants. Here, on the contrary, I will try to focus on performance, on representations that the actors actually bring to bear on ritual sequences, whether or not they are part of ideal competence. More importantly, I will try to show that the connections between action representations and the "conceptual scheme" are more complex than the theory's idealization would suggest. To reformulate the question in strictly cognitive terms, we are dealing here with two domains of mental representation. On the one hand, participants have some representation of what the ritual sequence consists of, of the various elementary acts that are combined in a given ritual. On the other hand, a host of other assumptions are associated with ritual performance. These assumptions belong to the various "repertoires" described in the previous chapters. So our description of religious ritual must provide a precise answer to the following questions: Which assumptions are activated in the representation and performance of ritual sequences? How are they connected to the representation of the ritual sequence? and more precisely, Do certain recurrent features of ritual sequences impose constraints on the range of assumptions activated, and on the way they are activated?

Anthropological descriptions generally contain an implicit answer to these questions, following which "cultural models" or "schemes" ac*tually inform the* features of rituals, in that they provide the explanation or the *raison d'être* of ritual sequences. To take the example of the Catholic mass again, a variety of features seem to be explained by assumptions shared between the participants. Believers generally give credence for instance to the New Testament account of the Last Supper, from which many features of the ritual can be inferred, notably the fact that it is supposed to be a *meal*. The participants also conceive ordained priests as endowed with particular capacities, which explains many differences in the respective participation of priest and congregation in the ritual. One could of course multiply such remarks, the basic point of which is that important *deductive links* obtain between "shared cultural models" on the one hand and features of the ritual on the other. In other words, the "cultural models" for a ritual such as the Catholic mass specify not only the exact gestures to be performed but also the reasons why they should be performed. However seemingly obvious, this view of ritual features seems to be based on a number of unstated and problematic assumptions, as I will try to show in the rest of this chapter.

Categorized Actions: Recognition and Cohesiveness

In order to describe the representation of ritual episodes, we obviously need a set of precise hypotheses about the way episodes *in general are* represented, in nonritual contexts. This, however, may be particularly difficult, as the representation of everyday episodes, even of simple ones, is a particularly complex domain, about which psychological hypotheses and findings are themselves often less than perfectly clear. Contrary to the domains examined in the previous chapters, episode representation is not the object of a unified psychological description. This is because "episodes" do not really constitute a cognitive domain; memorizing and identifying particular episodes may require very different types of cognitive processes, depending on the kind of scene that is processed. This being taken into account, I will try to show here that psychological hypotheses, however fragmentary, make it possible to highlight certain salient properties of ritual episodes, and by the same token to understand why certain accounts of ritual are misleading.

Categorized Actions

Ritual sequences comprise *categorized*, and often *named*, series of actions. This is in a sense self-evident, since ritual scenes could not be pointed at, experienced, reproduced, memorized, and so on if they were not clearly conceived as relatively discrete units. The existence of specific names for ritual actions suggests categorical divisions in the flow of action. This feature deserves to be mentioned, if only because it provides an initial contrast with most nonritual action. In everyday contexts, the flow of events that constitute actions is generally not divided in clear, unambiguous and mutually exclusive categories. First, actions may be described at several levels of abstraction, from a fine-grained description of elementary gestures to a high-level categorization in terms of large chunks of acts. Also, different categories may be used to designate a single action, depending on the aspects considered relevant. By contrast, names of ritual actions stand for precisely delimited series of gestures. Performing the action implies creating an exemplar of the category, and of no other category.

To take a classic example, consider R. Firth's description of the long series of Tikopia rituals known as the "work of the gods" (Firth 1967). This is composed of a complex series of discrete salient actions, such as THROWING THE FIRESTICK, DAY OF THE CHIEF, DAY OF THE ELDERS, and so on (ibid., 34). As Firth points out, "for almost every ceremony the Tikopia have a cliché, a cryptic reference which cannot be understood without a full knowledge of the actual procedure" (ibid.). In other words, the flow of action is divided here in an exhaustive set of organized *categories*. Each category refers to a certain series of gestures, which it considers at a certain level of abstraction. For instance, THROWING THE FIRESTICK is a ceremony that formally opens the cycle of the "work of the gods." The participants build a fire, in which is laid a long firestick. The principal chief of Tikopia sits with this fire on his left, the other chiefs facing him at the other end of the house. The firestick is then pulled out of the fire; an assistant takes some of the charcoal off the stick and rubs it on the chief's forehead. The firestick is then laid on a banana-leaf outside the house, and the chief recites formulaic incantations over it (ibid., 4348). This very concise summary of a rather complex series of gestures is sufficient to highlight two important properties of such categories of actions. First, the categories are used at a certain level of abstraction, which is neither at the lowest nor at the highest possible levels, as a description of elementary gestures or alternatively a general term for

"performing the work of the gods" would be. Also, the link between the category and the terms used to denote it is not necessarily simple. Firth for instance points out that THROWING THE FIRESTICK consists in laying it down ceremoniously, and precisely not in "throwing" it, this distinction being of great importance to the participants (ibid., 47). Whether a series of gestures constitutes an instance of THROWING THE FIRESTICK depends not on whether a firestick is thrown but on a complex combination of gestures and additional conditions. However seemingly obvious, these two characteristics of ritual action types are crucial to a description of their cognitive underpinnings, as we will see below.

Insofar as actions are *categorized, the* points made in previous chapters about conceptual structures in general should in principle apply to such action representations. In chapter 3, I made several points, summarized as follows, that may be of help in the description of action representations:

1. Conceptual structures include a representation of the *similarity* between instances.

2. Similarity, however, is not sufficient to provide conceptual structures with cohesiveness. All judgments of similarity are dependent on *implicit assumptions as* to what counts as pertinent features for class inclusion.

3. The discrimination between relevant and irrelevant dimensions of similarity can be provided by a set *of schematic* assumptions. Causally linked assumptions provide the explanation for the similarities observed.

4. The schematic part of conceptual structures can be complemented *with nonschematic assumptions, the* salience of which depends on their connections with the schematic ones.

I will take these principles as a starting point in my description of religious ritual and its specific features. A central

hypothesis here is that the features that make it possible to *recognize* certain objects as instances of a category do not exhaust the conceptual structure for that category. This, as we will see presently, is a particularly important point in the case of religious ritual.

Action Categories: Components and Background Assumptions

If we apply to action representations the principles listed above, we must make a principled distinction between two types of

representations involved in the identification of actions, focusing on the *components* of the actions and their *background conditions* respectively. The components are the subactions or elements, the combination or sequence of which constitutes the action in question. In some cases, actions are identified as occurrences of certain categories on the sole basis of their components. For instance, the particular move known as ROOKING in chess consists of a precisely identified rearrangement of king and castle. Any action that comprises these movements is an instance of the category. Such cases, however, are clearly exceptional, and the relevance of particular components for identification is usually constrained by implicit hypotheses, notably about the fact that certain background conditions obtain. Kicking a ball and pushing it toward and then past a metal frame can be just that, if no specific context is present, or it can be "scoring a goal" if the action is performed during a soccer game or "practicing goals" in other conditions. Although the components of the action, the subactions that compose it, are exactly the same, the background conditions are different.

Among the background conditions, the assumptions focusing on intentional attributions stand out as particularly important in the identification process. To take a simple example, consider L. Coleman and P. Kay's experimental study on the concept LIE in American subjects (1981). The subjects' spontaneous characterization of what a lie is focuses on what is perceived as a central component, namely imparting false information. However, when given series of situated examples and asked to sort them between lies and non-lies, subjects generally use three elements in the recognition process:

1. The speaker believes the statement to be false.

2. The speaker intends to deceive the listener.

3. The information imparted is actually false.

Cases in which all three conditions obtain are identified as typical or central examples of lies. In situations where only some of the conditions obtain, condition 2 overrides the other ones, so that the intentional attribution is more important to the identification of lies than the content of the utterances, although the subjects are not always aware of this. Such examples illustrate three facts that will be particularly important in the description of religious actions: (1) the relevance of components is dependent upon other assumptions, (2) intentional attributions are central in background conditions, and (3) subjects are not necessarily aware of their contribution to the identification process.

Are Ritual Sequences Schematized?

These remarks allow us to reformulate the anthropological question of "meaning" in a more precise way. The "deductive" view I described above implies that the representation of action categories is schematized. That is to say, for each category or type of ritual actions, there is a set of underlying assumptions that specify which components of the action are relevant to its identification as an occurrence of that type and why they are present in occurrences of that type in general. Assumptions of this kind are precisely what I described above in my very rudimentary description of the Catholic mass as an action category. If these assumptions are indeed part of the mental representations activated by the participants in a mass, then the conceptual structure for MASS has a schematic core. There are, however, many reasons to doubt that such is the case; certain familiar aspects of religious ritual would be incomprehensible if the relevant action categories were provided with such a schematic core. In the following pages I will first examine those aspects, and then

proceed to a more plausible description of the connections established between the representation of action sequences and other religious assumptions.

Ritual Sequences as Underspecified Structures

A first problem is that the schematic assumption, in this as in other domains, seems much too strong in its description of the assumptions available to or accessible by the participants. An anecdotal, yet important fragment of evidence is provided by the difficulties anthropologists themselves encounter in the field when trying to describe the conceptual background of particular rituals. More often than not, it is difficult to elicit from the informants any comment on the *raison d'être* of particular features of a ritual sequence. In many cases, the informants do not even see the point of such questions. When they do, they often produce elaborations whose idiosyncratic character seems to belie the notion of a *shared* cultural model. All this is familiar to anthropologists; the possible discrepancies between individual interpretations, as well as the link between the latter and "shared models," have been the object of much reflection and speculation. In the precise case at hand, I will argue that the assumptions activated in the context of religious rituals,

whether they are "shared" or not, do not play the role that the schematic interpretation would suggest. In order to make this clear, we need to describe more precisely some specific features of ritual sequences.

Underspecified Intentional Structure

In anthropological models ritual actions are often compared to an undifferentiated residual category of "everyday actions" which is not properly described. This is not a very efficient way of highlighting what is specific to rituals. Since ritual situations bring together categorized series of gestures, which are construed as integral "chunks," it may be more useful to compare them to *categorized* non-ritual actions. The apparent rigidity of ritual sequences, the fact that there are precise rules that specify what actions must be performed, makes them superficially similar to the conceptual structures called "scripts" in cognitive science. The notion of scripts originated in artificial intelligence research, notably in R. Shank and R. P. Abelson's work on the "comprehension" of simple stories by computer programs (1977; Abelson 1981). It was then used extensively in psychology and anthropology as a plausible hypothesis on the representation of standardized actions. A script can be defined as the representation of a prototypical scenario, such as GOING TO THE DOCTOR or TRAVELING BY TRAIN. The script specifics the actions involved and their order, as well as certain causal relations between them. The existence of such representations is made plausible by the fact that people can make inferences about such standardized actions even when they are presented with fragmentary accounts.4

Scripts make it possible to infer the missing elements of a fragmentary description. They also allow subjects to memorize a huge number of recurrent social episodes in a particularly economical way. In A. C. Graesser's model (Graesser et al. 1979, 1980; Nakamura et al. 1985)

> 4. This is manifest even in the simplest examples. Imagine the following account: "James went to the doctor. He examined him and said it was serious." Listeners are likely to represent many aspects of the situation that were not made explicit. For instance, they will probably infer, in spite of the ambiguity of the anaphora, that "he" refers to the doctor, not James. They will also produce more interesting inferences; if asked whether James was ushered into the doctor's consulting room, they will probably think he was. These effects are explained in a simple way if we suppose that there is a general representation of GOING TO THE DOCTOR which specifies the order of actions: one is first led to a waiting room, one is then ushered into the consulting room, it is the doctor who makes a statement about the patient's state, and other such routinized aspects of the scenario.

the representation of such episodes consists of a "script pointer" on the one hand, which indicates the type of situation of which the episode is an occurrence, and on the other hand a "tag" that provides information about the particular features of the episode. That is to say, people do not represent explicitly in memory all the specific features of an episode. Most of the features are supplied by the generalized script representation; those particular aspects that could not be deduced from

the general script are stored in the special "tags." This model suggests different recall performance for (1) the routine features of a scripted episode (e.g., "the lecturer wrote on the blackboard"), (2) the features that are irrelevant to the structure of the script (e.g., "the lecturer was wearing a blue skirt"), and (3) the features that violate the default values in the script (e.g., "the lecturer asked the students to decide what topic she should lecture on"). In particular, recall should be stable for the first type of features, and degrade much more rapidly for the second than for the third type, a prediction that is supported by the experimental evidence.

Many aspects of script representations are pertinent to a description of religious rituals, and I will return to this presently. At this point, however, it may be of help to emphasize certain crucial differences between rituals and the routinized scenes on which script theory is focused. In general, the scenes analyzed in cognitive research on scripts are examples *of goal-directed* actions. Take for instance the familiar GOING TO THE RESTAURANT script described by Shank and Abelson. This describes the routine sequence of eating out as consisting of ordered components, such as booking a table, being ushered in, being given the menu, ordering, eating, asking for the check, paying. Each of these components can be further divided into lower-level subcomponents, constituting a nested or hierarchical structure of actions and subactions. The general script corresponds to a central goal: to have food prepared and served against payment. In the same way, each of the component slots corresponds to a particular goal. In other words, the representation of the script includes not just a hierarchy of actions and subactions but also a corresponding hierarchy of goals and subgoals.5

5. This is why script representations have a certain flexibility, which makes it possible for subjects to modify their expectations even in scenes that are not strictly congruent with the script. Even if some subgoals have to be modified, this can be done by producing expectations on the basis of the higher-level goals. This also explains why the order of certain actions can be modified in many scripts. Insofar as the goals and intentions are there, they under-determine the precise sequencing of components.

The situation is rather different if we turn to ritual actions. Here the major goals cannot be divided further. To return to the Tikopia example mentioned above, the central goal of THROWING THE FIRESTICK is to make the land *tapu*, that is, to put it in a special state that allows for subsequent ritual performances but also imposes strong restrictions on normal social activities. People "must now act circumspectly; no one is expected to shout or make other loud noise in the whole island, no parties may sit out on the beach and talk .... At night people are supposed to sit within their houses" (Firth 1967, 50). Making the island *tapu* is a necessary condition for the general "work of the gods" cycle to begin. THROWING THE FIRESTICK is a form of goal-directed action in the sense that it is aimed to precisely that purpose and is thought to be indispensable for achieving it. The connection between actions and goals, however, stops at this high level of action description. It could not be extended further down, to provide an explanation for the particular acts described above: building a fire in a particular place, sitting in particular positions, laying down the firestick on leaves outside the house, putting some charcoal from the stick on the chief's brow, and so on. Such subactions are not connected to subgoals; they are performed only because they are necessary elements of THROWING THE FIRESTICK.

In ordinary scripts, intentional descriptions are possible at all levels of event representation. In contrast, it is in most cases impossible to specify the goals or intentions fulfilled by ritual performance, except at the higher levels of representation. This, obviously, is one of the most familiar properties of ritual sequences, though its theoretical interpretation is far from clear. Bloch expresses this aspect in a suggestive metaphor: "Ritual is a kind of tunnel into which one plunges, and where, since there is no possibility of turning either to right or left, the only thing to do is to follow" (1989, 41-42). This feature has many important consequences. Bloch himself stresses the effects of ritual formalization and the consequent reduction of choice at each step, and the social interaction built around religious ritual. Here I will focus on another aspect, the cognitive consequences of the partly unspecified intentional structure of ritual sequences.

Underspecified Background Conditions

As I said above, the identification of most categorized types of actions depends not only on observable components but also

on the assumption that a certain set of conditions obtains. These conditions include the actors' intentions as well as many other aspects of the situation. As far as intentions are concerned, we have already seen that ritual sequences are significantly different from ordinary scripts. I want to focus now on other aspects of the background conditions for which religious ritual displays particular characteristics.

Background conditions are, obviously, particularly important in the identification of ritual sequences as occurrences of particular categories. To return to Firth's Tikopia example again, the act of burning a stick and laying it on a bed of leaves does not necessarily constitute an occurrence of THROWING THE FIRESTICK. Some of the necessary conditions seem straightforward enough. If the person who performs the act is not a chief, if the positions of the participants do not conform to a particular pattern, and so on, then the action will not be identified as a performance of the ceremony in question. To express this in intuitive terms, one would say that the act does not constitute an occurrence of the episode type considered if it is not performed in the appropriate "context." This notion of "context," however, is much too vague to be of any theoretical use. It blurs the fundamental distinction between the objective aspects of a situation, on the one hand, and those aspects of the situation which are represented by the actors, on the other. "Contexts," understood as objective features of a situation, have no effects on the participants' understanding of a ritual occurrence, except inasmuch as they are represented by those participants. So our description of background conditions, and their contribution to the representation of rituals, is in fact centered on the context as represented.

All anthropological descriptions of particular religious rituals include a description of those background conditions which the participants view as a necessary element for performance. In order to celebrate the Catholic mass, one must be an ordained priest. Only chiefs can perform the WORK OF THE GODS in Tikopia. Such conditions are not exclusively focused on the person of the ritual officer and other participants; they may specify for instance the precise place and time of the ritual, the precise prohibitions that should be observed before its performance, and so on. Such conditions, it must be noted, belong to a particular type; they are *pre-scribed* conditions, positively stated as necessary for proper performance.

However important these rules, I will argue that a description of such prescriptions constitutes only a fragmentary account of the conditions of proper performance. Another, equally important aspect of background conditions must be considered. Since this other aspect is not

expressed as a series of prescriptions, it cannot be made manifest by eliciting a description of what should be there for a series of actions to count as an unproblematic occurrence of a ritual category. This unstated aspect becomes manifest in the converse situation, when a certain ritual is problematic and the participants must account for that problem.

Rituals are generally performed in order to bring about some specific event or state of affairs. But they sometimes fail. In cultural anthropology, the processes whereby people understand or explain such failures are not the object of much theoretical consideration.6 A major contribution was Evans-Pritchard's famous observation that people's trust in ritual efficacy is based not only on "theoretical" principles and the memorization of confirming instances but also on specific processes that make it possible to explain away any empirical refutation of ritual claims. When the Zande are faced with a clear refutation of oracular predictions, for instance, they tend to focus on the singular rituals that failed rather than on the general principles on which their efficacy is supposedly founded. There are "a number of ready-made explanations of the oracle's self-contradiction and [one can choose] the one that seems to fit the circumstances best .... The secondary elaborations of belief that explain the failure of the oracle attribute its failure to (1) the wrong variety of poison having been gathered, (2) breach of a taboo, (3) witchcraft, (4,) anger of the owners of the forest where the creeper grows, (5) age of the poison, (6) anger of the ghosts, (7) sorcery, (8) use" (1937, 330). People have a repertoire of possible explanations that make it possible both to record these failures and to safeguard the general principles.

The idea of secondary elaboration has been extremely influential in the treatment of ritual efficacy. This discussion, however, was confined to the "rationality debate," that is, the construction of models that could reconcile people's apparently irrational attitudes, as far as ritual efficacy is concerned, with their rational treatment of most practical problems in everyday life. This particular context, however, has led anthropologists to leave aside some interesting consequences of the principle of secondary elaboration. Secondary elaboration is certainly used in cases of

6. This is in many ways surprising. Anthropological accounts of ritual lay stress on the conditions deemed

necessary for proper performance. A logical step in such an investigation would be to consider cases considered "nonproper" and to examine how such cases are represented. This is a very common strategy in other domains. Pragmatic theories, for instance, derive considerable information about conversational structures from cases of miscommunication and repair strategies. There are, however, very few descriptions of "ritual failures" in anthropology, although such failures do occur.

empirical refutation of previously held beliefs, as a way of alleviating the tension between general principles and singular cases. This simplistic understanding of ritual failure, however, is neither very illuminating nor in fact really faithful to Evans-Pritchard's original description. Two crucial aspects of secondary elaboration are missed in the narrow "rationality debate" interpretation; both are crucial to our understanding of action representation in such ritual situations.

First, the phenomenon of "secondary elaboration" suggests that, in the participants' representation, there is in fact no such thing as a failed ritual. There are only cases of rituals that people failed to perform. The distinction between failure and nonperformance of a ritual X would be straightforward, if occurrences of X were identified solely on the basis of their components. When actions are identified on the basis of background conditions, however, the distinction is not a matter of fact, it is a matter of interpretation. The explanations given for practical failure, notably in the case described by Evans-Pritchard, imply that all such cases are cases in which the actions performed, the components, do not really qualify as an example of *benge* because they are performed in the absence of the necessary conditions. In such contexts, the most natural explanation for the failure of a ritual action is that the ritual action was not performed at all; only the components were there, and the components are not what guarantees the efficacy. Again, rituals can never fail, but people can fail to perform them correctly.

A second important aspect of the interpretation of failure (or more accurately, of problematic performance) is that the list of explanations that could be given for any particular case of failure is not limited to the nonpresence of the ordinary prescribed conditions. Given a particular case, it is always possible to put forward some conjectural explanation, such that its being true would provide a sufficient explanation for the failure. Anthropologists are familiar with the kind of dynamics whereby a consensual interpretation is gradually built by a selection of conjectures put forward by various individuals. Although this process of consensus building is interesting in itself, what is particularly important here is that it is achieved by pooling suggestions and hypotheses that are by no means the automatic outcome of a rigid model. To be more precise, the ascertaining of whether a ritual action is performed or not depends in a crucial way on whether certain background assumptions are held to be there or not. People who observe that a certain ritual has failed can always presume that *some* condition was not present. One may just presume that such violated conditions exist without specifying what they consist of.

This is probably an obvious aspect of "rationalization," but I think anthropologists have generally failed to grasp its implications. If any failed ritual can be explained away by the absence of unspecified background conditions, then, conversely, the identification of any ritual action, failed or not, depends on unspecified conditions. In other words, assuming that a certain series of observed actions are really a performance of the ritual X consists in assuming that there are many conditions satisfied, some or most of which are not and cannot be specified.

In other words, one may assume that "all the relevant conditions obtain," without having a fully specified representation of what these conditions are.7 In case this seems a particularly abstruse point, consider more trivial examples of actions represented with partly specified background conditions. Most people who follow cooking recipes have only a vague representation of the reasons why the steps in a complex recipe are ordered in the precise manner prescribed. Their representation of the components of the action can be extremely specific; the representation of the background conditions, however, is underspecified. The contribution of the unspecified background becomes relevant only when the prescribed sequence does not produce the expected result.

The Absent Schema and The Obvious Properties

In the above sections, I highlighted two important aspects of the representation of ritual sequences which do not seem

congruent with the hypothesis that ritual categories are based on a schematic conceptual structure. First, in comparison with other types of scripted sequences, ritual action categories do not include an intentional structure that would account for the presence and sequencing of the particular components. Second, the representation of the background conditions, which includes positive prescriptions, is underspecified. Although participants assume that all causally relevant conditions are present, they do not necessarily represent what those conditions consist of. These remarks make it possible to formulate in a more precise way, and perhaps to

7. This may be construed, in a rather loose analogy, as similar to an essentialist principle. It is perfectly possible to think that "whatever makes giraffes giraffes, this zebra certainly does not have it" without having the least idea of what actually makes giraffes giraffes. Indeed, this is the way most subjects represent most natural categories. Again, this is only an analogy; there is no evidence that anyone ever attributes "essences" to action types.

understand better, two familiar aspects of religious ritual sequences, namely their "rigidity" and the conflicting intuitions anthropologists have about their "noninstrumental" character.

Most students of ritual have commented on the particularly salient "rigidity" with which the participants consider the sequencing and precise execution of the components. There are a number of anthropological conjectures about the possible causes of this aspect. Some of these speculations just paraphrase local rationalizations of ritual obligations. The fact that the ritual has to be performed in precise conformance with a preestablished script is described for instance as a consequence of the participants' belief that the sequence was designed by the gods themselves. In a more refined type of conjecture, social coercion is invoked as the mechanism that leads people to consider faithful reproduction of ritual forms as necessary. As I indicated at the beginning of this chapter, such "generative" explanations seem unduly expensive, in terms of *ad hoc* entities and processes. Moreover, they are invariably insufficient, in the sense that there are indefinitely many cases in which these putative coercive structures or mythical justifications are absent. Yet such rituals are performed with the same obsessive concern for rigid reproduction. In the spirit of the "selective" account proposed here, it seems more economical to assume that the behavioral modality (or modalities) of ritual lead to the performance of sequences with partly unspecified intentional structures. These actions are identified, like recipes, partly on the basis of a background of unspecified conditions. "Rigidity" is a straightforward consequence of these properties of ritual sequences. Because the scripts do not have a fully specified intentional structure, one just does not have the possibility of changing parts of the sequence X and yet considering that one has indeed performed the ritual X. In other words, one cannot half-perform the ritual; one either performs it according to the sequence or else one simply has not performed it at all. Naturally, this gives ample scope for all sorts of coercive processes to take place. It would be wrong, though, to mistake the potential usage of ritual features for their cause.

Ritual is often characterized as "noninstrumental action." There is a strong intuitive difference between what people do when they protect their gardens with magical incantations and what they do when they plant and harvest; the ritual performers themselves are aware of this difference. It is difficult, however, to give any precise content to this intuition, and the term "noninstrumental" is more evocative than explanatory. After all, people seem to have some goal in mind when they

perform rituals, and to have some assumptions about the material consequences of the performance. This often leads to particularly vague and confusing descriptions about the "symbolic efficacy" of rituals. More simply, I would argue that these conflicting intuitions are the outcome of the features described in the previous pages. Ritual sequences seem indeed "noninstrumental" in that their particular components (the subactions) cannot be linked to particular goals and intentions, as can be done in other domains of actions, including scripted actions. Rituals, however, are also certainly "instrumental" if considered as recipes followed in order to achieve specified effects. The confusion here stems from the idea that the representation of a recipe should include a complete specification of its necessary background conditions, a requirement that does not apply even to trivial everyday recipes.

Sequences, Episodes, and Abductive Tags

Let me recapitulate the argument so far. In cognitive terms, the question of the religious "meaning" or significance of rituals can be reformulated as the question of the type of connections established by the participants between their representation of the ritual sequence on the one hand, and other types of religious assumptions (notably ontologies, causal assumptions, social categories) on the other. A natural and seemingly plausible hypothesis is that the various repertoires of religious assumptions (ontologies, etc.) constitute the schematic core of the categories. There are, however, difficult problems with this idea. The representation of the ritual sequences seems to have particular properties that go against the notion of a schematic core. In the identification of a particular ritual sequence as a member of a certain action category, the various assumptions that participants can activate in association with a ritual sequence seem neither necessary nor sufficient. Actions are generally identified, beyond observable components, on the basis of background conditions and specific intentional conditions. For ritual sequences, however, both the intentional structure and the background conditions are underspecified. So the schematic description seems more an illusion than a plausible description of the cognitive processes underlying the representation of ritual sequences.

If this is the case, what is the role of religious assumptions and what is their connection to the representation of ritual sequences? We seem to be left with two domains of mental representations which are obviously linked, although our models so far do not provide a realistic description of the link. In the following pages, I will put forward an alternative that accounts for the intuitively obvious link in terms of a plausible cognitive model. I will take a simple Fang example, and then generalize the simple points made on the basis of that particular case.

An Illustration' Fang Ancestor-Cult Initiation

One of the major Fang rituals focused on the ancestors is the *nku melan* (lit. "drinking the a/an"), the initiation to the ancestor cult, during which the neophytes drink a decoction of the hallucinogenic plant *alan*. The altered state induced by the drug is said to allow them to travel to the ancestors' villages and get direct "messages" from them. This lineage-based cult focuses on a set of relics, generally skulls and fragments of skulls from the ancestors. These are generally kept by the elders of a lineage in wooden boxes, tied to the main pillar of their house. These relic boxes (*bieri*) have to be divided when lineages divide. Only a fragment of the male population is allowed to see them and to practice the ancestor-cult rituals. These people are called "pierced heads" (*ntu-ban nlot*) as opposed to "normal" or "ignorant" people (*mmimie*). The initiation ritual metaphorically described as the process whereby their heads are "opened up," to allow direct communication with the ancestor-ghosts.

The initiation ceremony takes place at night, in a special shed in which a special space is separated by a high fence. Concealed by the fence, a table has been set up on which the skulls are displayed. In the first part of the ritual, the candidate is given the *alan* to drink, and all the participants sing special songs. After a while the candidate falls into a trance under the influence of the drag. This trance is construed by participants as a "trip" to the village of the ancestors. At this point, it is considered crucial that the candidate should stay "half-way" there, in between the world of the living and that of the ancestors. The candidate must go "far enough" to meet the ancestors and receive messages from them. Going "too far," however, would mean dying ("staying on the other side," as people say) as a result of the ritual. The older participants

sing to the neophyte, encouraging him to go further in his exploration of the ancestors' world. They also keep asking questions about the special messages the ancestors want to communicate. Whenever they consider that the trance is too deep, for instance when the candidate is unable to answer their questions, they whip him with special weeds, to "wake" him and help him keep some control over the trance.

After a while, when the neophyte is still in a trancelike state, he is taken blindfolded to the other side of the fence. The blindfold is taken off and the skulls are suddenly revealed. Often the skulls have been specially prepared (e.g., by putting fragments of mirrors in the orbits) to make the sight particularly awesome. Still under the shock, the candidate is told the names of the ancestors whose relics are displayed, and the elders give him full genealogical explanations. This marks the end of the major part of the ritual; the eiders generally sing till dawn, periodically checking that the initiate is kept awake.

This of course is an abbreviated description of a much more complex ritual, but these two phases (traveling to the ancestors' world, seeing the relics for the first time) constitute the basic articulation of the rite, at least in people's memories of it. Although the classical ancestor cults, focused on *bieri* boxes, have gradually lost much of their influence among the Fang, a number of new rituals have appeared whose initiation ceremonies are often straightforward imitations of this particular ritual. There is considerable ambiguity as to the connection between such ancestor cults and the magical capacities conferred by possession of the organ *evur*. In many contexts, ancestor cults are conceived as the main protection against the evil and disorder perpetrated by witches, that is, by people with *evur* (Mallart-Guimera 1975, 1981). This is confirmed by the fact that when the neophyte fails to fall into a trance, this is interpreted as a symptom of the possession of *evur*. The ancestors refuse to accept the neophyte, because of his "selfish heart." At the same time, .however, all such religious practices among the Fang are said to require considerable "strength," which for many people directly entails possession of an *evur*. So the question of whether *evur* and ancestor cults are opposed or connected very much depends on the speaker's viewpoint. For most outsiders, ancestor cult is directed by people with *evur*, who use it against witchcraft. For the initiates themselves, the cult is rather construed as a set of ritual anti-*evur* protections.

Now let me consider the ways in which religious assumptions and features of the ritual are combined. The above description is, in a way,

a classical example of anthropological ambiguity, in that I mentioned a series of religious assumptions, without indicating clearly whether the participants really represent them, whether they are shared, in what way they are formulated, and so on. If we want to be realistic about mental representations, even in the case of this short illustration, we must be more specific about these questions. The participants in *nku melan*, at least the elders, naturally have a rather precise "script" that specifies all sorts of particular components of the ritual, such as what songs must be used, the order in which they are sung, the particular layout of the initiation house, the kind of weeds that must be used to whip the candidate away from unconsciousness, and so on. Obviously, in this as in most contexts of oral tradition, the participants are particularly fastidious in terms of ritual propriety but have little in terms of "theological" justification for each component of the ritual. What they know is that it should be executed in that precise order, otherwise one just would not be performing the *nku melan* and therefore could not expect any of the results of this particular ritual, notably "opening up" the initiate's head and making communication with the ancestors possible.

Now let me turn to the background assumptions. There is of course no direct way to observe what assumptions are activated, but we can limit ourselves here to describing those which are necessary to the performance of the ritual. These assumptions focus on (1) the ontology of the ancestors, (2) the participants of the ritual, and (3) the possible effects of performance. It is necessary to assume that the ghosts (*bekong*) really exist, although they cannot be directly observed, and that they have particular properties, physical and psychological (all these assumptions were described in chapter 4, so I will not need to specify them here). Moreover, it is difficult to perform the ritual without assuming that the ancestors are not an undifferentiated mass, that they consist of different individuals with their particular genealogical connections to the living. The ritual would also lose some of its force it it were not assumed that the ancestors have mental properties that go beyond normal human capacities; they can for instance detect witchcraft operations, including the witches' plans, and denounce them. As to the participants, one must assume that the elders are of a particular kind, among adult males, in being "pierced heads" rather than "normal" persons. Finally, the effects of the ritual must be the object of two different assumptions. One is that *nku melan* turns a normal person into a "pierced head"; the other is that witchcraft operations and other such threats to normal existence can be averted thanks to the ancestors' warnings.

Identification and Abductive Inferences

As I pointed out in chapter 5, one must be wary of ethnographic descriptions in which the connection between particular statements and general principles is considered unproblematic. This was particularly salient in the domain of *causal* judgments. The connection between particular judgments like "*c* caused *e*" on the one hand, and general principles or laws such as "events of type Care causally responsible for events of type *E*" on the other, may seem intuitively obvious. In this domain, however, commonsense intuitions are misleading, and they leave out some important aspects of the

connection. One such aspect is the distinction between strictly deductive and abductive reasonings. If two events or states are unambiguously observed to be of types *C* and *E* respectively, and a general "*C*s cause *E*s" principle is held to be true, then a deductive inference demonstrates that *c* caused *e*. In many cases, however, both the identification of the events or states and the general principle itself are held as plausible conjectures, the main point of which is that, if true, they would account for the observed occurrence of e. Misinterpreting conjectural explanations as theory-based deductions can seriously distort our picture of religious representations.

An interesting aspect of abductive reasonings is that they are often used to contribute to the *identification* of a particular state of affairs as belonging to a particular category. This is obvious in everyday cases such as medical diagnosis, in which an underlying cause is hypothesized that would for example make the observed fever and headache a case of meningitis rather than influenza. This is another illustration of the link between taxonomy and causal assumptions, examined in chapter 5. The identification of a particular object or state of affairs as an exemplar or occurrence of a general class is typically grounded on the assumption that the class in question has particular causal propensities.

The identification of a particular situation as an occurrence of a certain type is a process of conceptual enrichment, for which many assumptions in memory can be activated. An important aspect of this enrichment process is that it can be done on the assumption that a certain causal context exists, without a specified representation of what that context consists of. This is why the connection between abduction and identification is particularly salient in situations in which the subject has only a fragmentary representation of the underlying causal mechanisms at hand. For instance, if one observes that a car stalls on a particularly cold

day, one may conjecture that the temperature is affecting the engine's performance, although one need not have a representation of why and how external temperature can have such effects. In such a case, one has the assumption that a causal connection obtains, although one does not know what it consists of.

Generalization: Episodes and Abductive Inferences

Let me return to the example of the *nku melan* ritual. As I said above, the various assumptions activated during the ritual all contribute to its identification as an occurrence of *nku melan*. By activating these assumptions, the participants can identify (1) what type of activity they are engaged in and (2) what its probable features and consequences will be. This much is obvious. It is less obvious, and perhaps important for an understanding of ritual performance, that the links between assumptions and ritual consist in abductive conjectures. A major reason for this is that most of these assumptions focus on unobservable states of affairs. For instance, participation in *nku melan* requires that one assumes (1) that some people with "pierced heads" have particular capacities and (2) that the actual participants in the ritual performed are indeed members of that special category. In the same way, the participants must activate various assumptions concerning the ancestors' powers, but as I pointed out in chapter 4, these are all conjectural. No one can know for sure whether a given person was or was not properly initiated or possesses the essential qualities that make "pierced-head" people. Moreover, the link between such facts and the capacities displayed in the ritual sequence is itself underspecified. The notion that only people with particular "essences" are able to communicate with the ancestors is assumed to be true, but no one has a stable and straightforward notion of why this is so.

To sum up, people who perform a ritual such as *nku melan* start from a representation of the components, the ritual "script" with its complex observable features. As I said above, this representation is underspecified in terms of both background conditions and intentional structure. The various religious assumptions activated are not necessary to the representation or performance of the sequence. They provide conjectures that if true enrich the representation of the episode and provide abductive explanation for the presence of certain features of the sequence. These abductive "tags" added to the script representation are provided by

whatever religious assumptions can be assumed to have causal connection with the features of the sequence. They are the outcome of a spontaneous search for pertinent assumptions, not of the deductive imposition of a "shared cultural model." This is why people's ideas about the "meaning" or the *raison d'être* of their rituals, either spontaneous or elicited by an

outsider, are often vague or idiosyncratic. They can be left unspecific, since they are not a necessary condition of performance, and they vary because different individuals are likely to represent and organize their religious assumptions in significantly different ways.

This description of the *nku melan* in fact constitutes a generalizable account of the connections established between episode representation and other religious assumptions. In the above sections, ! tried to show that the representation of action sequences in ritual contexts is partly unspecified. More precisely, the participants necessarily represent such episodes as identified by (1) a series of observable components and (2) a set of background conditions, not all of which are specified and many of which cannot be directly checked. My hypothesis is that various religious assumptions are activated in order to add to this partly specified representation. This is the major way in which ritual performance is connected to religious assumptions: the latter provide conditions that are conjecturally taken as true, thereby providing some of the missing background in the representation of the ritual sequence.

This point has general consequences for the cognitive description of religious interaction and transmission. First and foremost, one must notice that abductive explanations are *conjectural*. They make a certain aspect of the situation observed explainable, given a certain condition. This condition, however, and the causal link that connects it to the observed situation are only conjectures. This is a general feature of abductive explanations, including those in everyday domains. Moreover, the *explanans* in an abductive explanation is often an unobserved state of affairs. This is the case, for instance, when a physician confronted with a fever interprets it as a symptom of infection. In the absence of definitive tests, the infection is postulated as giving the best possible explanation for the case at hand. In the domain of religious capacities, this feature is particularly salient, since the explanatory condition is unobservable in principle. Whether someone is or is not a member of a certain religious category can be only inferred, not observed.

Another aspect of abductive explanations is particularly important here. As we can see from ethnographic illustrations, and in fact from everyday examples, abductive inferences are motivated by the explana-

tory needs particular to a given situation. This makes them very different from "theory-driven" inferences. The production of explanatory inferences is not motivated here by a need to produce an integrated or consistent set of principles concerning, for example, shamanistic capacities or priesthood or the powers of ancestors. The process of abductive identification is initiated by the need to represent a particular situation in terms that are relatively satisfactory *in that limited context*.

Ritual sequences are remembered in a particular way because of the rigidity and stereotypy imposed by the ritual behavioral mode. The special features of that mode make it particularly likely that the participants will try to find *some* assumptions such that their being true would confirm the identification of the ritual sequence. This, however, is not in itself sufficient to determine *which* assumptions will be activated. In other words, the links between ritual performance and religious assumptions should not be thought of as *necessary* connections. Whatever assumptions (1) are available in memory and (2) contain elements of abductive identification for the ritual performed are likely to be activated.

Psychological Aspects Of Causal Enrichment

There are two main reasons to favor this abductive interpretation over the classical anthropological idea that there are deductive links between ritual performance and religious assumptions. First, as I said above, the classical model inevitably generates a difficult problem, in that most participants in a ritual generally have only a very vague and fragmentary representation of the background assumptions that make it an occurrence of the ritual in question. This is difficult to understand in a purely deductive framework, where people are described as representing both the actions and their "meaning." The abductive model, as mentioned above, does not run into this difficulty, as it assumes that background religious assumptions are neither necessary nor sufficient for identification: they only fix the parameters that are left unspecified by the action representation. Second, the deductive model tends to ignore the whole process of acquisition of ritual categories. This process, to a large extent, involves a series of recognition rather than recall tasks. People are made familiar with rituals before they are given any "theoretical" principles that could justify the series of actions that are performed. Moreover, they recognize that a given series of actions constitutes a performance of the ritual X on the basis of the actions themselves, the external

features, before being given principles that would justify this recognition. In other words, the actions are identified as being exemplars of a certain ritual, but the principles that enrich such identifications are only supplied later.

There is nothing particularly mysterious, or indeed exceptional, about this process of gradual enrichment by spontaneous abductive conjectures. Indeed, this is the process whereby many script representations are gradually contructed in the course of cognitive development. There is ample evidence that infants and preschoolers organize scenes on the basis of generalized event representations, which are in many respects structurally similar to adult scripts (see for instance Mandler 1979; Lucariello and Nelson 1985). In many cases, though the child represents scenes as ordered, he or she does not have access to the intentional and other background conditions that account for the particular ordering. As R. Fivush points out, this is salient in such "mistakes" as climbing on a high chair in the hope that this will trigger the delivery of food (1987, 244). So children start with a script representation, the background of which is left largely unspecified and is only gradually enriched with causal assumptions about the various slots of the script and their connections.8 To sum up, the gradual enrichment of an underspecified script is not an exceptional phenomenon; on the contrary, it is the most common way of acquiring script representations. Ritual scripts are special only in that, even for competent adults, their conceptual structure is still underspecified, so that they can always be the object of enrichment provided by new conjectures.

Rituals, Assumptions, and Theologies

There is a general tendency in anthropology to characterize ritual action in quasi-theological terms, and to think that such characterizations are valid as a description of the participants' own representations. Criticizing this, I also tried to cast doubt on a common hypothesis, following which deductive links can be established between

8. This process may be crucial to the development of conceptual knowledge, and there is evidence that in some domains script-based groupings of objects are more salient than taxonomic classes. That is to say, objects are grouped together on the basis of the fact that they are substitutable in certain scripts, rather than on the basis of theories or similarities; functional categories such as FOOD or Toys are obvious examples of this phenomenon (Lucariello and Rifkin 1985; Nelson and Gruendel 1986; Fivush 1987).

religious assumptions and features of the rituals. The idea that some "shared" models both specify the sequence of the ritual and provide explanations for its features just flies in the face of the facts in most situations of orally transmitted ritual traditions. This last point deserves careful consideration. Is the hypothesis limited to cultural environments where transmission is mainly oral? After all, there seem to be many situations in which written texts not only specify correct ritual performance but also provide explanations for some or all of the components.

However, the existence of such theological models does not necessarily entail that participants in a ritual use religious representations in a different way from what I described here, although of course it makes it *possible* for them to do so. For the various types of specialists involved in the construction and transmission of such theological models, no doubt these texts provide sufficient explanation as well as the raison d'être for the rituals. However, there are several reasons to doubt that this particular view really constitutes an adequate description of the different participants' mental processes. First and foremost, as I indicated in chapter 6, it is a familiar phenomenon in the anthropology of literate cultural environments that the conceptual resources provided by religious texts are available, and indeed used, only by a small proportion of the religious followers. More importantly, even the participants who have access to such resources do not necessarily see them in a deductive way, as the sufficient explanation for the features of the ritual sequence.

An illustration of this phenomenon is given by C. J. Fuller's study of two major rituals in a South Indian Shaivite temple (Fuller 1985). The first ritual is initiation (*diksa*), which starts the long process whereby the initiate will be given the capacity to transform himself into the god Shiva after death. The initiation is performed by a guru who is supposed to be Shiva himself during the ceremony. The second ritual is the consecration ceremony (*abhiseka*), which establishes the authority of a master or gum. Fuller combines two sets of sources, his own ethnographic study of the Great Temple of Madurai (Tamil Nadu), and the text of the ritual manuals, most of which dates from the eleventh and twelfth centuries.

There are significant differences between the rituals as prescribed by the texts and the way they are actually performed in the temple. The most striking divergence lies in the relative weight given to these two rituals, and the consequent complexity of performance. In the textual sources, initiation is described in extreme detail, and is

actually considered the most important ritual, as it constitutes the first step in the identification with the god. Consecration is explicitly described as a minor ritual. Its purpose is, obviously, of a more mundane nature than initiation. In actual ritual performance, however, the contrast is inverted, in the sense that initiation ceremonies follow a very rudimentary pattern and are most often performed in private, with "scant attention to their significance" (Fuller 1985, 107). Consecration, conversely, is a very elaborate temple ceremony, performed with considerable complexity and decorum. In other words, the participants are performing actions that diverge significantly from textual prescriptions, in a cultural environment where fastidious observation of ritual prescriptions and the faithful transmission of scriptural material are considered of the utmost importance. As Fuller points out, it would be impossible to understand the religious "meaning" of these ceremonies without the texts. That is to say, the texts provide all sorts of elements that reduce the apparent arbitrariness of the features of ritual sequences. At the same time, however, actual religious practice does not consist in performing actions that would be predicted by the textual sources. The liturgical texts, however complex and specific, are clearly not *used* deductively to generate ritual sequences. Otherwise the discrepancies noted by Fuller would not arise. The order and details of the ceremonies are transmitted by direct example to participants, some of whom then use the textual sources in order to understand the *raison d'être* of ritual practice.

To sum up, we have here two possible ways of describing the connections established between the features of ritual action and the religious assumptions. In the theological situations described here, a set of texts seems to provide necessary and sufficient explanations for ritual performance. In the hypothesis I put forward in the previous sections, participants spontaneously activate whatever assumptions can contribute to the identification of the ritual sequence. There is a tendency in anthropology to think that the first model, the "theological" one, is a satisfactory description of the cognitive processes at hand, even in the case of people who do not have access to publically available representations, such as a written text. In such cases people are supposed to represent some kind of "cultural model," which fulfills the same function as a theology. Against this, I have suggested here that even when people do have access to theological explanations for ritual sequences, they do not seem to make systematic usage of these resources. I have mainly used examples from nonliterate environments, because in such

cases the insufficiencies of the "deductive" account are clear enough, given the absence of systematic theologies. The general hypothesis, however, does apply equally well to those cases, which in my view are the most common, in which theological models, though they may be partially known by a number of participants, are simply not used in the deductive manner theologians would take for granted.

Conclusion

The study of rituals is obviously a central part of the description of religious representations. There are indefinitely many different aspects of ritual that could be the object of empirical and theoretical investigation. Ritual stems from a behavioral modality (or a complex of associated modalities), some aspects of which are probably fossilized versions of animal displays. Ritual is also an aspect of interaction and can be described as such in terms of ethological models. Ritual performance often triggers particular emotions anchored on the components of scripted sequences. Ritual actions also have a "syntactic" structure that can be compared with corresponding structures in other domains. There is no reason why all these aspects should be amenable to a single unified theoretical description. "Ritual" is probably not a proper scientific object, the domain of an integrated set of causally related hypotheses, but some of its aspects are, just as "reproduction in zebras" can be the object of a theory, while "zebras" cannot.

Here I chose to focus on one particular aspect that is certainly crucial for an understanding of recurrence in religious assumptions. Ritual sequences are categorized; furthermore, they are categorized in a way that activates other types of religious assumptions. It seems difficult to understand the recurrence of religious ritual, as well as its recurrent aspects,

without a proper description of this categorization process. However, it is striking that there are so very few anthropological descriptions of the actual representations activated by ritual participants. More often than not, anthropological accounts aim at "making sense" of the components of ritual sequences by showing that they are not entirely arbitrary and can be related to various assumptions found in the cultural environment considered. There is of course nothing wrong with this enterprise, except that it sometimes carries less than altogether

plausible views about the participants' own representations. I tried to show that religious assumptions provide explanations for ritual sequences only in the sense that they provide a basis for *abductive* explanations of what the ritual consists of. In other words, these assumptions provide elements on which it is possible to establish the conjectural identification of the particular set of actions observed as an occurrence of the ritual X.

THREE
A SKETCH OF CULTURAL TRANSMISSION

8
Cross-Strengthening, Religious Truth, and Stability

Part 2 of this book provided a first set of causal hypotheses explaining recurrent religious representations. In order to make the various problems of representation and acquisition tractable, I had to idealize away from actual religious representations in two ways, regarding the environment of acquisition and the connections between assumptions.

I considered how cognitive processes would favor the acquisition of certain types of representations, regardless of whether these types are actually favored by the cultural environment or not. The hypothesis is that even if there was a completely random variation in religious representations, with every generation starting from scratch, certain types of representation would be favored. Essentialistic understandings would be more likely than criteria-based representations of social categories; ritual event scripts would be provided with background conditions through conjectural abduction, rather than deductive application of cultural models; ontological and causal assumptions would be more likely to appear if they combined an explicit violation of intuitive ontologies with a tacit confirmation of their inferential basis. But of course this is not the whole story; such general cognitive constraints are imposed, not on a random production of representations but on a distribution that is already skewed, as it were, by the representations of previous generations.

Another idealization stems from the fact that the various "repertoires" were examined in isolation, because there is no reason to assume that they are acquired and represented in functionally similar ways. As I indicated in chapter 2, this way of dividing the domain of religious representations may seem slightly artificial, however legitimate from a theoretical viewpoint. In people's religious representations, the various repertoires distinguished here are of course combined.

Both idealizations are necessary to a causal interpretation of recurrence. In order to make the causal hypotheses more specific, and closer to what anthropologists actually study in the field, it is now necessary to consider in what way and to

what extent the input given to "socialized" subjects is prestructured, and what influence this has on further representations.

In this chapter I will consider two types of phenomena that are crucial to the selective transmission of cultural representations. I will first consider the question of *systematicity*, that is, of the connections that subjects are likely to establish between religious assumptions that pertain to different repertoires. Religious assumptions are not a helter-skelter of disconnected ideas about supernatural agencies or processes. We must therefore describe their links, inasmuch as they have particular effects on transmission. Another, equally important domain is that of the cognitive processes whereby people evaluate the *veracity* of particular religious statements. One of the main sources of information about religious matters is the mass of utterances made about them. Obviously, the inferences drawn from these utterances are likely to be strongly influenced by the extent to which listeners take them to express truths. We cannot account for people's representations without describing why and how they select certain sources as particularly likely to produce true statements.

Stability and Systematicity

The questions of stability and systematicity in religious representations are both crucial and complex. A central hypothesis in most anthropological theories is that the questions of systematicity and stability are interconnected, that they are in fact two faces of the same phenomenon. We know (or assume) that people do not start from scratch at each generation, that most of their religious representations

are strongly affected by the presence of(roughly) similar representations at an earlier stage. We also know or assume that people's religious representations are linked and that the links must constitute part of the explanation for the fact that particular representations are entertained at a given time. Most anthropological frameworks provide a combined account of systematicity and stability, assuming that explaining one, to a certain extent, is explaining the other. Here I will argue that this intuition is fundamentally right: explaining the connections between religious assumptions certainly provides us with a grip on their stability, and vice versa. Yet I will have to take issue with most anthropological notions on either stability or systematicity, which seem to be based on implausible views of cognitive processes. Cultural anthropology is certainly right to think that questions about stability and systematicity are linked; however, the answers it has so far given are less than satisfactory. Here I will start from a consideration of systematicity, examining some intuitive hypotheses about the nature of the connections between religious assumptions, about the kind of "system" they constitute. I will then offer an alternative description of these connections before returning to the question of stability at the end of the chapter.

What leads us to say that religious representations form a "system" is a series of observed facts, namely that (1) there are some connections between different religious assumptions; (2) the connections seem recurrent enough to be somewhat predictable; and (3) there is often an approximation of consistency between them. These simple features are the basis of any ethnographic description of a set of religious assumptions. The difficulty, however, is to provide a coherent theoretical interpretation without falling into the trap of "theologism." Theologism is the combination of two essential mistakes. One is to take the connections between religious assumptions for granted, as a self-evident or necessary aspect of religious representations. The other is to think that they can be best described by postulating some abstract intellectual entities ("symbol systems," "webs of meaning," "cultural theories," etc.) that supposedly underpin the connections. Theologism, in its various guises, begs the question of systematicity by positing that religious representations *necessarily* constitute shared, integrated, consistent sets of assumptions, often in the face of less-than-perfect empirical confirmation. Moreover, it leads to models with cognitive implications that are always difficult to estimate. The religious assumptions are treated as the realization or implementation of abstract objects, the precise properties of which are not clearly described.

Here I will examine these issues from the viewpoint of a theory that is not committed to any theologistic assumptions. The questions to address are the following: Do subjects actually establish connections between religious representations? What is the format of the connections established, if any? Do such connections support the anthropologist's intuition that

recurrent religious representations, in a given cultural environment, actually constitute a system? My argument consists mainly, though not exclusively, in a deflationary account. I will show that in particular domains, which are crucial for a theory of religious representations, we often tend to misconstrue the nature of the connections established between assumptions. The argument is directed chiefly at a pervasive hypothesis following which there are *deductive* links between people's general "cultural models" and their judgments on particular circumstances. In other words, people are described as representing a set of general principles; given situations are identified as particular instances of those principles, and the principles are therefore deductively applied to the situations.1 This deductive hypothesis is implicit in many other frameworks. My point here is not to say that it is necessarily false but that it is certainly vague. In certain domains of religious representations, it constitutes a very misleading description of the cognitive processes whereby people make connections between different assumptions and apply assumptions to the description of particular situations.

Circularity: An Intuitive Description

Let me start with a feature that is easily characterized in intuitive terms and constitutes a limiting case concerning the connections between different assumptions. In many religious "systems," the

1. This seemingly unproblematic conception of cultural knowledge is shared by many otherwise divergent anthropological models. For example, "neo-intellectualist" accounts of religious representations describe them as an attempt to reach a *theoretical* understanding of the world, essentially comparable to scientific theorizing (Horton 1982, 229ff.; see also Skorupski 1976). A consequence of this approach is that particular judgments are described as the deductive application of theorems. Given the principle that witch doctors necessarily have witchcraft capacities, once someone is identified as a witch doctor he or she will be considered as having witchcraft capacities. In a radically different framework, the idea that cultural representations constitute a "pattern of meanings... a system of inherited conceptions" (Geertz 1973, 89) also suggests that the transmitted cultural system consists primarily of general conceptions that can then be applied to particular circumstances.

assumptions from various repertoires seem to be integrated in the most tightly knit kind of system conceivable, in the sense that they constitute a*circular* structure. This is one of their most obvious aspects for the anthropologist in the field, and one of the least studied or commented upon in anthropological theory. This feature appears in many different situations. People for instance judge that a particular case of illness must have been caused by a witchcraft attack since this particular disease is exclusively produced by witchcraft, but the evidence for this principle is that former cases of that disease were interpreted as induced by witchcraft because of the same principle. To take another example, people judge that the priest's utterance that there are three parallel worlds in the sky must be true since it was said by a "genuine" priest, but what makes him genuine, in the eyes of his audience, is that his utterances on such matters are judged true. Or again, people in a situation of oral tradition say that they perform their rituals according to what the ancestors recommended, but the only evidence for what the ancestors wanted is what is currently practiced.

Such examples, obviously, point to different types and areas of circularity. The "system" may be circular in the sense that a description of the world is based on assumptions that in turn presuppose that description itself. Legitimation can be circular, in that religious authority (or rather authoritativeness) presupposes a certain division of status that is often justified in terms of differences in authority. What should we conclude of such descriptions? We tend to resist the idea that a cultural "system" could be circular because the term seems to imply a value judgment. Against this, I would argue that we cannot make sense of intuitions unless we examine their grounding. There are all the more reasons to examine this circularity if we remember that some perfectly respectable belief systems are circular in a much more precise sense. Take the familiar problem of the justification of inductive generalization. Why do we believe that most giraffes are long-necked? Because we have observed quite a few giraffes, and most or all of them had a long neck. But why do we think that observing a feature in a number of giraffes should increase one's belief in a general statement about these animals? Because we believe that, if one has a certain hypothesis and observes many instances that confirm the hypothesis, then one is right to think that it is generally true. The only reason why this strategy is thought to be valid is that, so far, it has worked very well in most domains of experience. In other words, we believe in specific inductive generalizations because we believe that they generally work, a principle which is

itself an inductive generalization. As Hume put it (1748, 330), induction "must be evidently going in a circle, and taking that for granted, which is the very point in question." So there is nothing particularly shaming in entertaining thoughts that can be reduced to or described as circles. To sum up, not all circles are vicious.

A Particular Circle: Fang Positions and Actions

A simple example may give a clear illustration of this phenomenon. The Fang category MBOMMVET, mentioned in chapter 2, designates storytellers, who specialize in long epic stories (Boyer 1988). The *mvet* repertoire, named after the instrument used to accompany it, is sung during long nightly sessions that are a recurrent element of funerary rituals. The singers are specialists who have undergone a personal initiation, which in many aspects is closely similar to that of the witch doctors (*ngengang*) and other ritual specialists among the Fang. In practice, this implies that the epic singers, like other specialists, have the witchcraft capacity (*evur*) and are therefore rather uncanny characters. Although they constantly claim to be "working for the good," that is, against witches and for the good order of the village, there is a constant suspicion that their activities are in fact of an antisocial nature.

The *mvet* sessions are an important social event that brings together several villages. In those sessions, it is generally agreed, important truths about such matters as ancestors or witch craft are communicated; these important ideas cannot be reached in ordinary contexts. *Mvet* players are among the initiates, those who know about past knowledge and hidden agencies. During a *mvet* session, the singer typically intertwines very long and complex epic stories that recount the interminable wars between clans of giants and an account of the singer's own initiation in the ghosts' world. These stories and lyrical evocations are typically couched in a rather archaic and extremely complex poetry, full of obscure metaphors and allusions to reserved domains of knowledge, often used in a contradictory or paradoxical way. For instance, the ghosts or ancestors are mentioned in both the stories and the narrative of the singer's initiation. Both descriptions are quite complicated; the ancestors' unpredictable behavior brings about sudden *coups de theatre* in the narration. As for the lyrical evocation of the singer's initiation, it is generally so obscure that even competent listeners, like ancestor-cult specialists, get bogged down in the intricacies of the poet's adventures. To compound these

difficulties, both descriptions are strikingly different from, and sometimes incompatible with, what is received as common wisdom about ancestors.

At the end of a *mvet* session, the participants have definite intuitions about the quality of the performance. Although there can be some discussion, people generally agree that what happened the night before was a success or not. This is phrased in a straightforward way, as a distinction between sessions which are *mvet* and sessions which are not *mvet* at all. These judgments are always about the sessions as a whole, not about the stories, the initiation songs, or the music. Also, there are no qualifications to the judgment. The session in its entirety "is" *mvet* or not, and that's that. It is rather difficult to understand exactly what makes certain sessions stand out as "real" *mvet*, while the others are considered failures, or rather nonperformances. This is all the more difficult since the elements that normally compose a *mvet* session do not seem to be entirely pertinent in that judgment. For the Fang, the *mvet* session is mainly characterized by the combination of stories and music. People can appreciate and comment on the difference between good and bad stories, between pleasant and uninspired music. Also, they recognize that certain types of initiation song are particularly evocative or intriguing, while other songs are just tediously obscure. None of these elements, however, is mentioned in the final judgment, which seems a rather intuitive affair. People typically justify the intuition by saying that the *mvet* singer is a "real" one (in cases of success) or a fraud, but this is obviously more a consequence of the judgment than its justification.

The authenticity of this position depends on two assumptions, namely that the person is a *beyem*, an *evur*-bearer (which in the case of a practicing singer would be generally assumed), and that the person has undergone the appropriate initiation. Several idioms express this idea: the singer must "possess the *byang* (medicine) of *mvet*," he must have "eaten the *mvet*," he must have "bought" it, and so on. The initiation to epic singing is closely similar to that of witch doctors; it consists of a series of trips to the villages of the ghosts, with whom the neophyte is supposed to strike a deal: the neophyte acquires the capacity to remember the songs in return for a "payment," the exact nature of which is never made clear. To most Fang people, there is no doubt that the capacity to sing *mvet*, like most capacities linked to *evur*, is paid for by giving the life of a relative. This is what people are alluding to when they say that someone has "eaten the *mvet*" or "possesses the *byang*." There is always a considerable and necessary ambiguity about these matters, an

ambiguity that is constantly reinforced by the singers' obscure statements about their initiation. No one can ever be entirely sure that the singer is "really" initiated; although the singer himself constantly proclaims that he was given the secrets of *mvet*, he could never go so far as to claim that he gave away the life of a relative, which would be the only definitive proof of a compact with the ghosts. As a result, judging that a person is or is not a "genuine" singer is a matter of conjectures, which can be made more or less plausible by various additional arguments. For instance, the reputation of a singer can be enhanced by rumors concerning his bizarre behavior; some singers are particularly dirty; others live in shabby houses or keep telling frightening jokes and anecdotes about witchcraft; some do not weed their cocoa plantations; and so on. In a Fang village, such bizarre behavior gives rise to many comments and conjectures, which invariably focus on the idea that the singer is probably engaged in witchcraft, although the hypothesis is seldom made explicit. In other words, whenever a singer comes to give a *mvet* session to a village, his reputation is already there, and the precise actions performed during the session are judged against that particular background.2

The status of a *mvet* singer in his everyday village existence depends to a large extent on what he can achieve during sessions. Although most villagers find *mbommvet* rather uncanny and frightening, they undoubtedly yield a certain influence since they are thought to be more likely than other people to know about ghosts, ancestors, and witchcraft. This is the positive side of the ambiguous reputation; *mvet* singers are supposed to be particularly knowledgeable in the most important domain of Fang culture, that of ancestor-related ideas and actions. When their status as respectable experts is thus evoked, this is always on the basis of their ritual performances. People will thus contend that a certain singer is especially wise and learned, the proof of this being that he can sing about the ghosts "for nine nights without even giving half of what he knows." The ritual performance is thus crucial in the construction of the singer's status in nonritual contexts. To sum up, *mvet* performances seem to be judged on the basis of people's assumptions about the person of the singer. These assumptions, conversely, seem to be based on more or less rearranged memories of ritual performances.

2. See Boyer 1988 for a more detailed description of this dangerous balancing exercise, in which *mvet*: players try to be convincing as intimates of the ghosts without being taken literally for witches. Although most singers are clever enough to control the game, as it were, they are sometimes forced to leave a village or stop singing, having gone too far on the bizarre, witchcraft-suggestive side of the ambiguity.

A General Feature Of Religious Systems

There is no point in providing more illustrations of this phenomenon, which is perhaps one of the most common features of actual (as opposed to theological) systems of religious ideas. In chapter 6, I tried to evaluate the extent to which the identification of religious social categories is based on intuitive essentialist principles. Although the categories can in principle be "defined" or characterized by a number of external, observable features, in most cases such features are neither necessary nor sufficient for membership. As a consequence, identification, at least in principle, is always a matter of corrigible guesses. Indeed, in most religious systems one finds that such corrections and reidentifications are possible, though there is considerable variation in the extent to which a given group makes use of such conceptual possibilities. As a consequence, the assumption that a given person "really" is a shaman or a priest, or really belongs to any other category of religious officeholders, is made more or less salient by additional assumptions. For instance, the fact that the person is said to have undergone a particular initiation can be taken as an argument for the assumption that he or she is "genuine." In literate cultures, the fact that the person has acquired a vast scriptural knowledge may be taken as an index of his or her god-given capacities. More generally, a central theme in the identification of social categories, in the religious domain, is that they are made manifest by the right or the capacity to perform particular actions. Catholic priests are recognizable by the fact that only they can perform baptism or exorcism, or celebrate mass; in a similar way, shamans are recognized as such by virtue of the cures they effect. More generally, social categories are directly associated with typical actions.

The connection between these two registers obtains in the other direction as well. The identification of religious episodes, in many contexts, seems to depend directly on a prior identification of the participants. Any Catholic believer knows that

a mass that is not celebrated by a properly ordained priest is not a genuine occurrence of the mass, though exactly what it is an occurrence of may be rather uncertain. More generally, many religious episodes require the participation of specific actors, belonging to particular social categories. The assumptions concerning the identity of the participants are particularly salient, in that they are conceived as necessary (and ultimately unobservable) conditions.

The juxtaposition of these two arguments seems to lead to the inevitable conclusion that the intellectual processes involved are totally (and viciously) circular. The identification of actions presupposes ideas concerning the actors' positions, which in turn presuppose ideas concerning the actions themselves. This is indeed the conclusion that should be drawn from the description given above. The description, however, is fragmentary, and the aspects omitted are crucial to the understanding of "circularity," as we will see presently.

In order to understand what underlies the intuition of "circularity," one must keep in mind the distinction mentioned at various points in the book between *epistemic* and *cognitive* viewpoints in the description of a set of representations. In the precise case at hand, this means that we should have a closer look at the various assumptions and at the connections established between them. It may be the case that some aspects of the "circles" considered are not properties of the mental representations actually entertained but are properties of their idealized (epistemic) descriptions.

Identification and Causal Enrichment

In this section I will make two points that should serve as an initial description of the cognitive processes involved in seemingly "circular" sets of religious assumptions. First, I will show that the assumptions are connected by inferential links that are not deductive, contrary to what the idea of a circle seems to imply. Second, I will try to show that these inferences are unlikely to be co-present in any actual reasoning.

Episodes and Causal Enrichment

Let me first consider the assumptions activated in the identification of a particular action. This theme was treated in detail in the previous chapter, so I will mention here only the general features of the process. The argument of chapter 7 focused on one crucial question: what cognitive processes make it possible to identify a given sequence as an instance of a category X? This, as we saw, must be formulated in more precise terms, as consisting of two separate processes. First, certain

elements make it possible to recognize a particular sequence as an instance of X. These, however, are only relevant against a background of additional assumptions. Some of these are the outcome of the particular behavioral mode that is triggered in ritual situations. Others derive from repertoires of religious representations, notably from the ontological assumptions and the identification of social categories. To sum up, the identification of actions was described as a process of enrichment by abduction. The participants can associate the given sequence with a particular script. This script underspecifies both the causal structure of the sequence and its background conditions. A series of conjectures can supply some of these missing conditions and intentional aspects by taking as given particular ontological, causal, and social category assumptions.

This, obviously, applies to the identification of *mvet* sessions as described above. The identification of the session itself as an instance of *mvet*, as opposed to other types of social interaction, is based on observable features, such as the time and place of occurrence, the presence of someone who calls himself a *mbommvet*, the performance of an epic song, and so on. Beyond these features, what makes the identification more plausible is a series of background assumptions, for instance that there are such things as ghosts, that it is possible to meet them and make deals with them, that such deals can give the human party exceptional talents, and so on. In the identification of the particular session considered, these assumptions must be completed with another one, to the effect that the singer is a "real" or "genuine" *mbommvet*. All these conjectures are activated by the initial recognition of the performance as an occurrence of *mvet* and contribute to the plausibility of this initial recognition.

The *mvet* case is, to a certain extent, special in the sense that the reality or the authenticity of a performance is explicitly considered as problematic. For the Fang participants, it is always possible (and in fact happens) that a *mvet* session, although it has all the features that make up the stereotype, is considered not genuine. As a consequence, some of the assumptions that contribute to the identification process are discussed explicitly. This is notably the case for the assumptions concerning the person of the singer, the authenticity of his initiation, the veracity of his initiation song, and so on. In other words, the *mvet* case displays in overt discussions and reasonings the assumptions that, in other social contexts, would be activated as a plausible interpretation of the observed sequences.

It is important at this point to emphasize the difference between this account and what is suggested by the intuitive description of the situation as a "circle." Ira series of assumptions constitute a genuine vicious circle, this means that an assumption A inevitably activates B which inevitably activates A, and so on. This would be the case if the connections between assumptions constituted *deductive* inferences. To return to our example, this would suggest the following description of the identification of a *mvet* session. The participants identify the particular social interaction as a possible example of a *mvet* session. They then activate a deductive schema of the form "*if* it is performed by a *mbommvet then* it is a *mvet* session." If they assume the premise of the schema to be true in the particular instance, they deduce that the performance really is an instance of the category MVET SESSION. As I tried to show at several points in the course of this book, this deductive account is generally less than perfectly plausible. In the case at hand, it would constitute a severe distortion of the actual cognitive processes involved. There is no evidence that the Fang ever reason on the basis of a deductive schema such as the one mentioned above. On the contrary, they seem to accept the possibility of a genuine *mvet*-singer producing nongenuine performances. Furthermore, it is in principle impossible to take the genuineness of a *mvet*-singer as an established fact. That someone is or is not a genuine *mbommvet* is a matter of corrigible inferences, not of direct observations. This is why the abductive interpretation is more realistic. The participants identify the interaction as a *mvet* session on the basis of observable features. The assumption that the performer really is a genuine *mbommvet* is activated as one of the background conditions that enrich this initial recognition and strengthen it (a point to which I will return presently).

Essentialism and Enrichment

Let me now consider the identification of persons as members of a certain social category. The main point of chapter 6 was that the identification process is often constrained by tacit *essentialist* principles, partly analogous to the intuitive understanding of categories of living kinds. External, observable criteria constitute the obvious basis for recognition, that is, for activating the assumption that a given person is a member of a category. These criteria, however, are generally taken as insufficient, and even nonnecessary, in people's inferences about particular cases. Essentialist interpretations seem to prevail, notably in local,

nonscholarly understandings of religious positions, even in situations where alternatives are available.

This makes it possible to understand in a more precise way the connections established between presumed membership in a social category, on the one hand, and various observed features, on the other. In the Fang example described above, a *mbomvnvet* is usually described as someone who performs specific actions. More generally, all categories of ritual specialists (*ngengang*) are spontaneously described as attached to particular types of ritual action. However, such examples of performance do not *entail* that the performer really is a member of the relevant category. In actual inferences, subjects take their memories of ritual events in a less constraining manner, simply as an *index* of membership. Performance may well be described explicitly as what makes a certain type of *ngengang* different from both other *ngengang* and nonspecialists; implicitly, it is taken as nothing more than a generally reliable indicator of membership.

This phenomenon is not at all mysterious if we remember that essentialist principles necessarily include *causal* principles. This is true in the intuitive application of these principles to the biological domain, as well as their conjectural extension to nonbiological, social categories. The principles that govern intuitive apprehension of living kinds specify not only that they have some internal or underlying resemblance, beyond observable features, but also that underlying

features or properties are causally responsible for the external resemblance. This applies to social categories, too, inasmuch as they are construed according to essentialist principles. Religious officers are considered as different from other people in a variety of different ways, including some underlying properties. These are causally related to the observable features and are routinely used to explain both the salient ones, such as religious capacities proper, and indirect features, such as external appearance, ways of speaking, and so on.

My main contentions here are that (1) such identification processes are intrinsically *causal*, and (2) they constitute *abductive* inferences to the best explanation. They are causal in the sense that they establish a connection between a condition (possession of some unobservable property) and what is taken as an outcome of that condition (in this case, the performance observed). They are abductive because they are based on a conjectural assumption that if true would make the observed situations unsurprising. The person considered is observed to perform actions of a certain ritual type; this is made unsurprising by the assumption that

they really belong to the religious social category considered, in which case they have the capacity to perform the actions as a result of unob-scrvable properties. The difference between such inferences and deductive ones is manifest in the way general principles and particular assumptions are combined. In the identification of a person as a member of a religious social category, subjects are not activating and linking general principles. The assumptions activated are:

1. an assumption about a particular episode (e.g., "this is a properly performed instance of ritual *x*")

2. an explanatory conjecture about a particular person ("this person is a member of category *y*")

3. a causal conjecture ("it is because of membership of category *y* that the person performed *x* successfully")

In other words, we are led to a conclusion that is similar to the point made above regarding the identification of particular episodes, but in the opposite direction. The observable features of the category are taken as plausible indices of category membership; they cannot support deductive inferences. In the abductive model put forward here, the activation of memories of specific episodes and performances does not constitute a deductive basis for inferences, but it does contribute to the strength of the identification.

Circles and Simultaneity

We must add a crucial qualification to the idea of a "circle." The idea of positions identified in terms of actions, themselves defined in terms of positions, seems indeed circular, since the outcome of each type of inference is used as a conjectural basis for the other type. Even this, however, may be based on a distorted description of the situations in which both types of inferences are actually produced. As I mentioned above, having a vicious circle between *p* and *q* would mean, in principle, that the inferences $p \rightarrow q$ and $q \rightarrow p$ are co-present. However, in the example at hand this may not be the case. The assumptions are co-present only in a theological description of the religious representations. If, however, we accept that the assumptions in question are used as abductive conjectures, it becomes clear that they may well be entertained by subjects in different circumstances because they provide enrichment to different types of representations.

The example of *mvet* sessions and positions will illustrate the question of co-presence. During the sessions, or in the discussions about these ritualized events, the most salient topic of conversation is the question of whether the event constitutes an instance Of MVET SESSION or not. As I tried to show above, this is not a purely academic or aesthetic debate for the Fang. Important statements about the ghosts and their behavior, as well as their relationship with villagers, are made during *mvet* recitals. Epic songs are often recited in the broader context of funerals, and some people consider that the recitation may contribute to the efficiency of the ritual. In this kind of situation, the genuineness of the singer is used as an argument to enrich the representation of the episode.

This, however, is not the only type of situation in which the connection between action and social category is pertinent.

In everyday contexts, *mvet* singers are the object of particular representations in their villages. They generally behave in ways that would be shocking on the part of other villagers. Most of them have particular habits or a particular appearance that sets them off from the rest. *Mvet* singers often neglect their plantations, do not keep a tidy front-court, or make jokes about witchcraft events; such behaviors stand out in a Fang village. In such contexts, the salient questions are whether the person in question really has particular connections with the ghosts, and why. Again, this is not a matter of idle speculation. Everyday interaction with a person endowed with witchcraft capacities may become dangerous. Establishing the state of other people's relationships with the ghosts is therefore a requirement of village life. In such situations, people are likely to identify the person as belonging to a particular social category, such as MBOMMVET, and to activate various memories of episodes as abductive arguments. The underlying assumption, in this context, would be that the sessions said to be genuine are actually genuine. This is indeed what happens, in that people who distrust a certain *mvet* singer, for instance, will typically mention the sessions he has performed as an argument for avoiding any close relationship with him.

The assumptions linking action to social category, and conversely social category to action, are therefore unlikely to be activated at the same time, simply because they provide causal enrichment for different questions. This is another aspect of the difference between the deductive usage of principles and their abductive activation. If the assumptions about action and social category were used deductively, they would not be tied to any particular situation or explanatory context. Abduction, however, is by nature a context-bound, relevance-driven type of infer-

ence. Assumptions are activated inasmuch as (1) they have some initial plausibility, and (2) they would, if true in the case at hand, provide an explanation for the observed situation.

The assumptions activated in the interpretation of religious episodes or social categories should not be mistaken for context-free general propositions. In the description of these cognitive processes, we must avoid an implicit view of cognitive processes that could be called "hyper-theoretical" or "non-pragmatic." In this view, minds are conceived as theory-building devices, every operation of which is aimed at optimizing the overall representation of the world, that is, making it more satisfactory in terms of coherence, descriptive richness, explanatory power, and so on. This, however, is a slightly distorted picture. An important feature of cognitive systems is that they are faced with extremely varied, ever-changing particular demands for explanation or interpretation, with which they deal according to simple constraints of sufficiency. In other words, they are forever trying to solve, here and now, very specific problems with the minimum of cognitive fuss, as it were. That human cognition produces representations that sometimes, in some domains, constitute a (roughly) well-ordered and reasonably accurate picture of the world certainly adds to the adaptive value of human cognition, but this cannot be taken as the goal that directs every cognitive operation.

These common features lead to a characterization of what is perhaps the most important feature of the connections between religious repertoires, namely the possibility of cross-strengthening among assumptions. The assumptions concerning positions are strengthened by the identification of particular actions, and those concerning actions are strengthened by the identification of particular persons. In the following pages, I will describe another type of inference in which this phenomenon is particularly salient, before turning to a general description of the strengthening processes.

Evidential Accounts and Enrichment

The kind of mechanism described here may be a very general form of inference underlying the representation of cultural matetial. In another book (1990), I presented a cognitive account of a particular domain of inferences, which focuses on the truth-value of

utterances produced in certain types of social interaction.3 In any cultural environment, some contexts or persons are singled out as offering guarantees of truth about particular topics, especially religious ones. For instance, a shaman may be considered as among the few people who "really" know about the ghosts. Divination techniques may be used to produce guaranteed statements, which provide (among other things) a true description of' what the ancestors want. In

order to understand how religious assumptions are represented and transmitted, it is therefore particularly important to describe the processes that account for the persuasive power of such utterances and such situations. Surprisingly, this topic is not really the object of much attention in anthropological theory. The discipline has produced interesting models of coercive processes, whereby people are led to abide by the pronouncements of authority, but it does not include a cognitive description of the processes of persuasion. To a certain extent, these processes illustrate the phenomenon of enrichment described above, as we shall see presently. In order to describe certain "truth-making" inferential processes in detail, I must begin with a rough description of the evaluation of truth in general.

Evidential Accounts

There are certainly many different ways in which listeners can represent what makes a particular utterance true. For each utterance, listeners represent a particular *evidential account*. This consists of a series of assumptions that, if true, make it the case that the utterance is true. The representation of the evidential account generally includes at least a rough description of the process whereby the true information has been acquired by the speaker. This account can be called a *causal-representational* story, and runs as follows. The speaker has intended to communicate some aspect of some state of affairs, for example, "Take warm clothes, because *it's cold in Minnesota in February*." I presume her utterance expresses a true fact about weather in Minnesota. The speaker's utterance is (taken as) true because it conveys a mental representation that happens to correspond to the way weather really is in Min-

3. What follows is a precis of the book, modulo a few points that were left implicit in the original formulation. For want of space I assert here points that are argued in detail and illustrated in the original version. I am grateful to Dan Sperber for noticing that the argument of *Tradition as Truth and Communication* could be rephrased in the terms of the present framework.

nesota. What makes this representation true is that, in some more or less direct way, it is Minnesota weather itself that led the speaker to produce it. For instance, being in Minneapolis in February she experienced the biting cold. The state of affairs triggered the mental representation (this is what makes the story a *causal* one), and her utterance conveyed that mental representation (this is the *representational* aspect of the story).4

The causal-representational (or "C-R") account is a very general and spontaneous way of providing an evidential account for an utterance. When listeners hear people making straightforward statements, intended to convey some information about some state of affairs, listeners spontaneously activate the C-R account as a default value. From the earliest stages of cognitive development, children tend to take for granted this aspect of communicative behavior. This probably is part of the intuitive psychological presumptions described in chapter 4. Inasmuch as listeners take an utterance as conveying some information, they activate some minimal representation of an evidential account, which has a causal aspect (from state of affairs to representations) and a representational one (between the representation and the communicative act). A consequence is that we tend to suspend or at least reconsider our assumption that the utterances heard are true when we are led to believe either that the causal link is not obvious or that the representational aspect of the utterance is muddled. If the speaker has never set foot in the United States, I may be led to have initial doubts about her description of weather in the Minnesota, because the causal connection between weather in Minnesota and her ideas about it becomes much more complex. If I know her to be a pathological liar or an aphasic patient, I will have doubts too as to whether her utterances convey her beliefs. The more we know about the directness of the causal connection, and the less we consider the representational complexities, the more we are led to take the utterance as true.

Two important points must be stressed here. First, doubts about an utterance are always a complexification of the evidential account represented. In other words, the assumption that an utterance, inasmuch as it expresses a statement, expresses what the speaker considers a truth, is an *initial presumption* from which the evaluation of the utterance starts. If the evidential account can be filled with positive arguments, it is strengthened; alternatively, it can be filled with assumptions that cast

4. strictly speaking, of course, the representational part of the account is itself a causal hypothesis. What is assumed by the listener is that the speaker has mental representations, which will cause his or her utterances to take the precise form they take.

doubt on the utterance. It is a very general and familiar point in pragmatics that listeners must take as a starting point the hypothesis that speakers are trying to communicate what they take to be the truth. The hypothesis is necessary as a starting point, even in cases where the interpretation process leads to the conclusion that a speaker's statement was actually false or deliberately misleading. Second, in many or most cases the evidential account assumed to obtain is left largely *underspecified*. If on my arrival at Chicago airport, I read a poster explaining the different ways of reaching downtown, I do not bother to imagine by what experience or process the authors of the poster acquired their knowledge of the city. I take the information as true, on the assumption that there is *some* evidential context, such that it provided the authors with true information, although I know little about that context. The evidential account for an utterance can even be reduced to a bare existential generalization, to the effect that "there is an account E, such that E makes it the case that utterance U is true."

Nonstandard Aspects

In many situations of religious interaction, one can find utterances that constitute a direct challenge to this causal-representational account. The utterances and the situations in which they are produced have properties that, in principle, should make it particularly difficult to build a coherent representation of the evidential account. These utterances are nevertheless taken as true, and more often than not as expressing particularly important truths. Moreover, the utterances are not just taken as true *despite* these particular properties but *because* of them. These aspects that hinder the standard C-R account are not only ignored as arguments against their being true but in fact taken as positive arguments for their veracity. This deserves some special explanation.

Let me first give some indication of the properties in question. Many aspects of particular religious utterances may make them less than perfectly tractable by the C-R account. Three properties are very frequently observed and stand out as particularly important here:

Obscure contents. This is a very common and often misunderstood characteristic. The utterances that many listeners consider to be the expression of important truths about religious agencies or events are couched in particularly vague or obscure terms, obscure even to the speakers themselves. In some cases the utterances in question are ex-

pressed in formalized "special tongues," that is, artificial languages deliberately devised to make understanding difficult or impossible. In other cases, the supposedly true statements consist in gnomic formulas. To sum up, some salient utterances are considered to express a truth in conditions that make it particularly difficult to specify their content.

Nonintentional production. This corresponds, roughly, to the domain of divination. Supposedly true statements are produced by using particular techniques, which determine the content of the utterances. In cases of "mechanical" divination, people typically use a randomizing device (e.g., a pack of cards or a pair of dice) to provide definite answers to yes/no questions. In contrast, other types of divination make use of inspirational techniques. In such cases a person is liable to produce particularly salient statements because he or she has been put in a special state of consciousness, such as a trance. In both cases, a consequence of these techniques is that the content of the utterances, as far as the listeners can judge, is not determined by the speaker's intentions. This provides a salient contrast with ordinary utterances. In divination situations, although a person is actually making a statement, the content is clearly determined by a process that is not controlled by the speaker him- or herself.

Non-obvious experiential basis. In many cultural environments, the capacity to make true statements about crucial religious matters is reserved to particular categories of speakers. This is one aspect of the creation of religious social categories, described in chapter 6. Typically, a particular experience is among the features activated in the identification of such categories; priests are priests because they have been ordained. In many cases, it is interesting to note that the experience in question, which is supposed to provide a guarantee of truth, has little to do with the transmission of information. A salient case is that of shamans and other such specialists, who are not considered "genuine" members of the categories in question unless they have undergone a specific initiation. In most cases, such initiation rites provide no information that could be the basis of further statements; whatever knowledge is activated in further statements is not

acquired through such situations. These are nevertheless considered a sine qua non condition. In many cases, the idea that a specialist is not "genuine" after all is formulated as a doubt about his or her initiation.

Obviously, none of these aspects is necessarily an exclusive characteristic of *religious* statements. There may be other domains of social interaction in which utterances with these aspects are particularly salient. It is important, however, to stress that such properties of utterances are recurrent and can be found, in isolation or combined, in many "religious systems" described in cultural anthropology. Equally important is the fact that, in such situations, the particular properties listed here arc, as I said above, not taken as obstacles to an evaluation of the truth-value of the statements. On the contrary, they are generally taken as indexes of veracity. It is therefore necessary to describe the particular assumptions activated in the evidential accounts for such utterances. The assumptions must be such that, once combined with the salient properties considered above, they strengthen the presumption that the utterances are true.

In order to describe the relevant cognitive processes, it may be of help to understand why these properties are often ignored or misunderstood in anthropological descriptions. As I said above, anthropological accounts often depict people as evaluating the truth of religious utterances *despite* those special properties. This, however, flies in the face of the facts. People not only take the nonintentional production of the utterance as important, they actually take it as the crucial argument for its being true.

Why then is it difficult for anthropology to take this aspect into account? This may be understood better if we remember that the causal-representational account is an intuitive, commonsense notion. Because of this, it is generally transparent and used as a default value in our judgments of other people's statements. For the same reason, it is also assumed to be the kind of account that other people create in order to evaluate the truth of utterances. Anthropologists are of course no exception; they spontaneously (and rightly) assume that in most circumstances, people (including their informants) resort to the C-R account. This, however, is particularly difficult to maintain here, in the sense that the special properties of the utterances are such that they make the C-R account difficult. A way out of this difficulty, for the anthropologist, is to assume that these properties are not actually important in people's evaluation of truth; they are not taken into account by the listeners and constitute only a form of attention-demanding decorum, nothing more. Another, more realistic way to solve this problem is to face the difficulty and describe the kind of evidential account that can be activated if the properties in question are really taken into account by the listeners, which seems to be the case.

Causal Enrichment of The Evidential Accounts

The reason why some religious utterances may seem special is that they make certain aspects of the C-R account difficult to construct. In particular, they make it difficult to build a coherent account of the *representational* part of the evidential account. This is an inevitable consequence of the properties mentioned above. If a speaker makes statements in formulas that are not entirely interpreted, it becomes more difficult for the listeners to construe what mental representations are involved in the production of the utterance. This difficulty is used systematically in the case of divination, where it is clearly stated that the speaker's mental representations, whatever they are, do not take part in the production of the utterance. One of the most frequent aspects of divination rituals is that the diviner states explicitly or clearly demonstrates that the results of the divination session escape his or her control. The representational part of evidential accounts is also hampered by appeals to experience, for instance in cases of initiation. In such situations, the speaker is presented or construed as truthful by virtue of his participation in particular episodes. The nature of these episodes, however, makes it impossible to imagine in what way they could have contributed to the speaker's representations. It is for instance a salient feature of initiation rites that they are consistently presented as contexts in which knowledge is acquired; at the same time, however, the nature of the episodes demonstrates clearly that no specific information is being transmitted. The initiation "lessons" are often obscure or consist in reacquiring skills that were already mastered. More often than not, the rites center on paradoxical ordeals, which by their very nature preclude the transmission of any coherent content. When information is indeed transmitted, its acquisition is not considered a sufficient or even necessary condition for successful initiation. In many cultural environments, the candidates actually avoid receiving the secret information, a fact that does not in any way jeopardize their subsequent status as initiates. F. Barth for instance describes a complex series of New

Guinea initiation rites, in which most candidates consider that receiving secret information involves considerable danger and is not necessary for successful initiation in any case (Barth I975). As D. S. Gardner puts it, in his description of another New Guinea initiation, "rituals are considered efficient regardless of what can be called the cognitive change brought about in the

candidates" (Gardner 1983, 352). To sum up, the experience of initiation cannot contribute to a speaker's subsequent utterances in a way that can be represented by the listeners.

A consequence of these particular properties of some religious utterances, then, is that the evidential accounts constructed by listeners will be fragmentary; in particular, their representational part is likely to be either empty or else filled with the assumption that the speaker's mental representations *cannot* be involved in the utterance. This, however, does not mean that it is impossible to build an evidential account; it only means that the evidential account will not have the standard C-R format. Since the representational part of the story is either missing or known to be absent, the assumptions activated in such contexts are likely to focus on the causal part of the account. In other words, the listeners are likely to represent the various causal factors that link the utterance to the state of affairs it purports to describe. Indeed, this is not only what listeners actually do but also what certain aspects of the utterances and the situations suggest to them very clearly. To return to the properties mentioned above, a recurrent theme in divination techniques for instance is that the diagnosis is directly caused by the situation it describes. This is sometimes suggested in the form of a general principle, such as "it is the ancestors who move the diviner's wand [which produces diagnoses about the ancestors]" or "the god himself is speaking through the priestess [who is making statements about the gods' intentions]." In other cases, this causal link is asserted in the form of its counterfactual equivalent, such as "the cards would not have turned up this way if you were not being threatened by So-and-so." A similar kind of direct causal link is often suggested in the case of obscure or formulaic statements, presented as directly inspired or indeed produced by supernatural agencies; a recurrent characteristic of these utterances is that they are supposed to contain true statements about the very agencies that caused them. This causal link is also suggested, although in a less direct form, in the case of statements supposedly guaranteed by previous experience of initiation episodes. To return to Gardner's New Guinea example, the candidates are not required to memorize or even hear the ancestors' secret songs, communicated during initiation. What makes initiates different from noninitiates, for the group, is that they have been "exposed" to the ancestors' power. In other words, what makes them, in subsequent situations, authoritative on matters relating to the ancestors, is a causal link between the ancestors themselves and the utterances about them.

Veracity and The Direct Causal Interpretation

The various situations briefly described here have two common properties. First, they make it difficult for the listeners to build standard C-R evidential accounts for the utterances in question. Second, they make it possible to represent, and in many cases clearly suggest, a causal connection between the state of affairs described in the utterances and these utterances themselves. Listeners are led to conjecture that the specific form of the utterances, which was not a result of the speaker's representations, was a direct consequence of the state of affairs described.

As I said above, assuming that there is *some* causal link does not necessarily imply representing what that link consists of. Indeed, in many cases the listeners who assume that there is a direct causal connection between a state of affairs on the one hand, and the utterances about it on the other, would be unable to specify what the connection consists of. It is perfectly possible to assume that "the cards would not have turned up this way if I was not being threatened by So-and-so," without representing by what process a situation, the alleged threat in this instance, could have brought about the particular display of the cards. In other cultural environments, some explanations are available, and listeners make use of them to a variable extent. In any case, specifying the causal connection is not necessary, in the sense that positing a direct causal connection, however unspecified, is enough to create an evidential account for the utterance, an account that marks it off from ordinary statements. The evidential account for ordinary statements is indirectly causal; it specifies a causal connection from state of affairs to representations, and another link from representations to utterances. Here, by contrast, the listeners assume that the connection between state of affairs and utterances is direct in the sense that it by-

passes the speaker's mental representations.

Why does this constitute a criterion of truth? The postulation of a direct causal link is likely to contribute to the evaluation of an utterance as true because of the listeners' intuitive assumptions about mental processes, on the one hand, and typical causal connections, on the other. As I said in chapter 4, the assumption that mental entities are immaterial and can *mis*-represent a perceived situation is available very early in cognitive development. Even very young (normal) children can grasp the notion of misrepresentation, its possibility, and its consequences. In intuitive psychology, the fact that the subject herself or her

interlocutor has a representation *p* does not entail that *p*, and is construed as perfectly compatible with *non-p*. Not to put to fine a point on it, thoughts can be wrong and even young children are aware of that obvious fact. By contrast, prototypical causal connections consist, again very early in cognitive development, in mechanical cause-effect sequences in which it would be surprising to observe the effect if the cause was not present. If a causal connection is assumed between two events or states *c* and *e*, a subsequent occurrence of *e* will lead the subject to assume that *c*. This (nondemonstrative) principle underlies all abductive conjectures. If the subject once represented the car's stalling as a consequence of an empty tank, she will be led to conjecture, the next time the car stalls, that the tank may be empty. To sum up, construing a mental representation as mental leads one to assume that it can be misleading; representing a connection as causal leads to conjecture that it may correspond to a stable pattern.

These principles, obviously, are likely to have important consequences for the evaluation of the truth of an utterance. In the kind of situation described above, the utterances are represented as directly caused by the states or events they describe, not by the speaker's mental representations. In other words, the aspects of utterances that are intuitively represented as a potential source of misrepresentation are excluded from the evidential account, while the aspects that suggest a stable, potentially general pattern are salient. In metaphorical terms, the utterances are supposed to be true because they are construed as the stable symptoms or indices of the situations they describe.

Causal Accounts and Systematicity

As I said above, anthropological theories, by and large, do not provide a satisfactory account of the processes whereby certain sources are selected as offering particular guarantees of truth. There are of course precise descriptions of the "authoritarian" character of certain cultural environments, of the coercive mechanisms that ensure compliance. This, however, is an entirely different question. As far as the persuasive power of certain statements is concerned, we generally tend to ascribe this effect to three main factors. First, we assume that in a particular cultural environment, people share a series of "cultural axioms" that specify which sources can be regarded as truthful. Second, we tend to think that the statements in question in fact express what are the common presuppositions of most people's models; they are therefore

considered true because they express or confirm people's more specific assumptions. Finally, we sometimes focus on the way certain utterances are protected from refutation (this is the "secondary elaboration" theme, briefly discussed in chapter 7). I tried to replace these explanations with a simpler hypothesis, following which in certain circumstances people are led to produce evidential accounts that describe the utterances as direct consequences of the states they describe. Such nonstandard accounts, because they exclude representational aspects, are likely to strengthen the assumption that the utterances in question express a truth.

The construction of evidential accounts implies that assumptions from different registers are combined, and therefore the assumptions seem to constitute systematic arrangements. Take for instance the Fang notion that the *ngengang*, that is, specialized healers, are a privileged source of truth as regards the ghosts, their behavior, and their interaction with humans. This is made particularly salient in ritual circumstances, in which for instance a *ngengang* makes definite statements about a certain witchcraft case. Some of these situations provide a clear illustration of the kind of direct causal link described above. The specialist falls into a trance, during which the ghosts reveal to him the true nature of the case at hand, as well as the appropriate remedy or course of action. The utterances of the specialist in such circumstances are considered both particularly likely to be true, and independent from the *ngengang's* ideas about the case. They can be

construed by the listeners as suggested directly by the ghosts, in other words as caused directly by the states of affairs they describe. Now a crucial assumption here is that such a causal link is more likely to obtain if the speaker is a *ngengang*, as opposed to any other kind of speaker. This is what makes a *ngengang* particularly reliable as a source of true statements. We could describe this by saying that it is a "cultural axiom" among the Fang that *ngengang are* sources of truth about the ghosts. However, such an idea of "axiom" is both question begging and in fact unnecessary. What happens is that the statements are found true because of the evidential account that includes a causal link between the ghosts and the utterances. In this evidential account are activated all the assumptions that could strengthen the hypothesis of such a causal connection. Now the fact that the speaker is a *ngengang* is among these assumptions. As I mentioned at various points, categories like NGENGANG are represented on the basis of essentialistic principles. This implies that the members of such a category are intuitively conceived as having particular causal propensities, as a consequence of their essence. This is why it seems particularly plausible to

people that their utterances can be selected as specially reliable in certain domains. Having particular causal propensities, they can be the object of causal connections that do not obtain for members of other categories. In this case, an initial assumption about the evidential account for a statement leads to activation of a set of assumptions concerning the natural difference between members of different social categories. In an analogous way, the Zande notion that true diagnoses can be produced by the *benge* oracles (Evans-Pritchard 1937; see chap. 7) is bound to activate assumptions concerning the identification of an episode as a *benge* consultation. As I said in chapter 7, Evans-Pritchard describes the processes whereby prediction failures are reinterpreted as nonoccurrences of the ritual; oracles cannot fail but can fail to be performed. It would be impossible to evaluate the truth-value of the *benge* diagnoses without activating a series of assumptions about what makes a genuine instance of oracle consultation.

The important point here is that all such links between truth evaluation and other assumptions are of the abductive format. Assumptions are likely to be activated only inasmuch as they allow or facilitate the construction of evidential accounts. The principles, following which "shamans know about spirits" or "divination yields true diagnoses," are not the starting point of deductive reasonings but the possible outcome of repeated abductive inferences.

Strengthening and Stability

The inductive model put forward here requires a precise description of the mechanisms of *strengthening*. I proposed to reinterpret certain "systematic" aspects of religious assumptions as the probability that certain assumptions will be activated in particular contexts. The main hypothesis here is that, given a certain interpretation of a situation, a number of assumptions can be activated, such that they contribute to the plausibility of the interpretation. For instance, people are identified as belonging to a particular social category (e.g., PRIEST or SHAMAN) on the basis of certain features. This initial identification activates all the assumptions likely to strengthen the identification, for instance memories of episodes that require the intervention of a shaman qua shaman. So if we want to understand why certain particular assumptions are likely to be activated, and why they are consequently recurrent in a certain environment, we must describe how they are strengthened and contribute to the strength of other assumptions.

In chapter 3, I described very briefly some characteristics of nonschematic assumptions, which are particularly important for a description of the cohesiveness and transmission of religious representations. A crucial point is that, given a certain situation, the activation of a nonschematic assumption is not automatic; it is a probabilistic event. There is no reason to think that we could describe the various processing events that lead to the activation of a particular assumption. Yet we can describe factors that are likely to increase (or decrease) the likelihood of activation. Among these factors, I identified two interrelated functional properties of nonschematic assumptions, namely their *credal status* and their *salience*. Credal status is a measure of the subject's commitment to the fact that the assumption provides a true description; salience is the objective probability that an assumption will be activated, given a certain situation. We are chiefly concerned here with the phenomenon of *strengthening*, that is, with the fact that the salience of certain assumptions is increased. We want to explain the particular recurrence of certain mental representations, which is a direct result of cognitive salience. In chapter 3, I also introduced, on the basis of rather mundane examples, a fundamental characteristic on the inductive

process: that strengthening *goes backward*. On one hand, assumptions that are "posted" as descriptions of a situation are not necessarily strengthened in the process. On the other hand, assumptions used as precursors for the ones that are posted are indeed strengthened. This feature is somewhat counterintuitive. We tend to think that assumptions are strengthened inasmuch as they are repeatedly entertained as descriptions of situations. Induction theory shows that this intuition is not entirely right. In the cases described here, for instance, we see that a particular identification (the "posted" assumption) is based on a number of background assumptions. For instance, the idea that the ancestors make the diviner say the truth about ancestors is based on the assumption that the diviner belongs to a particular kind of human beings, with special properties. In such a case, it will be the background assumption, concerning the fact that the diviner is indeed of a special kind, that will be strengthened, not the assumption that he did say the truth. To take another case, the fact that the Fang *mbommvet* is a real ghost expert (the "posted" assumption in some everyday contexts) is based on assumptions concerning the genuineness of past storytelling sessions. Whenever the first assumption is "posted," it is this latter assumption that is strengthened. In the following pages, I will try to show that this feature has important consequences for the relative short-term stability of religious assumptions.

Cross -Strengthening and Recurrence

My main hypothesis here is that, all else being equal, the strengthening processes described above are likely to result in a relative stability for certain religious assumptions. Before proceeding to this point, however, we must dispel some common misunderstandings that hamper a satisfactory account of this aspect of cultural representations. Here the term "stability" denotes the fact that religious assumptions activated in a given situation are often similar to those activated in previous circumstances. To take a simple example, consider the Fang ritual *nku melan* described in chapter 7. In order to perform it, and to identify it as, precisely, a performance of *nku melan*, the participants are led to entertain a number of assumptions regarding the existence of ancestor-ghosts, their causal powers and other properties, and so on. They must also entertain certain assumptions about the various acts in the *nku melan* sequence and their ordering. Most of these assumptions were already present, in a roughly similar form, in earlier episodes. More generally, the fact of stability is both overwhelming and consequently transparent. We find it self-evident that most people in most groups carry on having (roughly) the same religious representations through their lifetime, and that their offspring tend to make use of (roughly) similar ones. Indeed, this seems so obvious that only sudden changes or discontinuities appear to require a special explanation, while relative stability is often taken as unproblematic, as the "unmarked" situation.

In the explanation of relative stability in religious representations, we must avoid a series offallacies concerning the *scope* of stable transmission, its *ontology*, and the *process* that underlies it. A spontaneous hypothesis, in the description of any set of cultural representations, is that the features that recur, during the short span of time typical of ethnographic investigations, probably constitute immemorial "traditions," transmitted in a roughly similar form for countless generations. As many anthropologists have pointed out, however, this unsupported claim has been generally held uncritically for reasons more ideological than scientific. Unless we have specific evidence for long-term transmission of cultural representations, we must be wary of such spontaneous extensions of short-term trends. The question of ontology is more complex and cannot be discussed at length here (see Boyer 1990, chap. 1, for a more detailed presentation). It often seems natural to think that the stability of cultural material must be described at the level, not of actual

mental representations, but of abstract underlying objects, such as "worldviews" or "cultural models." In the pages above I provided examples of the serious distortions that can result from such exaggerated notions of "systematicity." Again, in the absence of specific cognitive evidence, there is no reason to presume that the recurrence of a given representation entails the transmission of a "model." Finally, as a consequence of these ontological hypotheses, the process that leads to stability is very often misunderstood or described in a way that is not strictly plausible from a cognitive viewpoint. One major confusion consists in assuming that the stability of cultural representations can be explained as an *intentional* process, the result of a group's "conservative" attitude to its own cultural material, or of the anxiety and uncertainty generated by cultural change. Against this, one must keep in mind that cultural stability depends on memory processes, notably on encoding and retrieval, which are beyond the control of conscious subjects. More generally, there does not seem to be much correlation between the range of cultural material that recurs from one generation to the next and

people's attitude toward that material.

Variants and Biased Selection

At various points in the course of this book I advocated a "selective" model of recurrence. This implies that people do not live in simple cultural environments, where an integrated "cultural scheme" is shared by most members of the group and unambiguously displayed in various episodes of social interaction. More realistically, we must conceive that, at any time, cultural assumptions are available in many different variants. This is a simple result of(among other things) the fact that mental representations, as I argued repeatedly, are under-deter-mined by cultural input. Given a particular episode, for example, a particular ritual performance, there is no reason to think that all or even most participants will entertain the same assumptions in the representation and interpretation of the episode. Moreover, the episodes themselves, which are categorized as occurrences of a single category, will probably display indefinitely many differences. Not to put too fine a point on it, people live in cultural environments where constant undirected variation is the rule rather than the exception. This implies that individual minds are constantly making "choices" between alternatives. Consequently, relative cultural stability must be interpreted as the result of a particular selection process. The selection is *biased* in the sense that

it does not reflect accurately the chance variations; on the contrary, it tends to increase the likelihood of activation for certain assumptions.

That cultural environments necessarily generate constant variation, and that actual selection is biased, can be illustrated by returning to the example of the *nku melan* ritual. Different occurrences of the ritual constitute different episodes. They are categorized as instances of a single category, by the participants as well as the anthropologist, only because both tend to focus on certain features and ignore others. A twofold selection is operated, often unconsciously, first between pertinent and nonpertinent features of a ritual occurrence, then between the variants displayed by the pertinent features.

To take the first point, even in the simplest case of ritual episode, an accurate memorization of all features of an actual performance, if possible, would greatly exceed the participants' mental capacities. In literate environments, too, performance necessarily adds indefinitely many irrelevant or unimportant features to the ritual "script," however fine-grained its description. This is a trivial point, but one must remember that memorizing a ritual sequence cannot be achieved by just "observing what is being done"; one requires a prior set of tacit hypotheses about what is relevant. Performing a ritual inevitably entails doing many things besides what the performer considers the pertinent segments of action. People cannot "observe and imitate" unless they first select out many features, tacitly considered irrelevant or contingent.

Another selection inevitably takes place between the variants displayed in the pertinent elements of a ritual episode. That is to say, one should not take at face value the participants' intuitive apprehension (often shared by the ethnographer) that different occurrences of a ritual type, for instance, are exactly similar, even in their pertinent aspects. In the *nku melan*, for instance, many salient aspects display significant variation, such as the order of the songs, the extent to which the candidate's altered state of consciousness is crucial to the proceedings, and many other elements. Even when they deviate from the participants' explicit description of what should happen, these features are not always the object of much attention, though they sometimes lead to persistent trends. This is true for ritual occurrences, and is *a fortiori* even more salient in domains other than the ritual repertoire. For instance, Fang people's assumptions about the capacities and particular traits of the different participants in a *nku melan* (the elders of a lineage, the *ngengang*, etc.), as well as their assumptions about the causal propensities of the plant *alan*, often diverge in significant ways.

To sum up, stability should be approached in the same way as recurrence in general, as the outcome of a series of processes that increase the likelihood of activation of certain assumptions. Certain religious assumptions are made stable by the fact that different subjects, at different times, entertain them and use them as the basis for reasonings and actions focused on religious entities. It is clearly beyond the scope of any cognitive framework to account for the exact processes whereby each subject is led to entertain them. Such particular causal chains are too complex and too diverse to be amenable to any theoretical description. What is, however, both crucial and tractable here is the probabilistic aspect of

the question, the fact that certain assumptions are more likely to occur than others. So we should have a precise account of the various ways in which this probability is increased. Obviously, this effect can be the result of many different factors. A crucial one is the strengthening process, whereby certain assumptions are entertained as providing a causal enrichment for descriptions of particular situations.

Strengthening As A Cause Of Biased Selection

In the above sections, I described one of the mechanisms that contribute to the cognitive salience of certain assumptions. Salience is understood here as the objective probability of activation, given a certain situation. Some of the "systematic" aspects of religious representations could be explained as the outcome of such strengthening processes. The fact that assumptions are used in abductive explanations increases their cognitive salience, which in turn has consequences for their subsequent probability of activation. In other words, the strengthening process results in a reduction of the number of alternatives, accompanied by an increase in the activation probability for each of the assumptions considered. A predictable consequence is that, at least in the short term, the strengthened assumptions will be more recurrent than alternatives.

This explanation of recurrence by strengthening marks an important difference between a cognitive approach to inductive thinking and the commonsense notion of persuasion that we spontaneously apply to cultural representations. As I indicated above, assumptions are not strengthened by the fact that they are "posted" as descriptions of situations. In other words, cultural assumptions are not made more salient just because they are used often. Assumptions, in this model, are strengthened if they are used to enrich descriptions of situations, that is, if they serve as

precursors in their representation. The religious "circles" gave us an example of the way such enrichment processes lead to apparent systematicity and to recurrence. The identification of a person as a member of a social category is enriched by memories of particular episodes. That is to say, the assumptions concerning episodes are "precursors," to use the language of induction theory, of assumptions concerning the particular person as a member of a social category. Whenever the "successor" assumptions are posted, the precursors are likely to be strengthened. What happens when we have a "circle," as is the case in many cultural environments, is that, among the pool of assumptions available to a subject at a given point, some assumptions are such that they can be used alternatively as precursor and successor. If they are used in this way, their salience will be increased; that is, they will become even more likely to be activated. In other words, the variety of assumptions activated will tend to decrease and the likelihood that each of the "survivors" is activated will increase.

Stability and External Cues

The "probabilistic" explanation of salience and recurrence makes it possible to reconsider another aspect of cultural transmission which is often misunderstood or approached in a misleading way. In keeping with the hypotheses presented in part 2 of this book, this argument may seem unduly biased toward the description of orally transmitted religious "traditions," as opposed to the kind of system that can be conveyed and transmitted by an institutional clergy, notably on the basis of preserved texts. In such situations, there seem to be powerful "stabilizing" factors that work independently of the mechanisms described here. Also, even in situations of purely oral and noninstitutionalized religious transmission, one can find elements that seem to reinforce, or at least run parallel to, the individual selection processes described here. Most importantly, most religious activities produce or make use of *material tokens, the* intrinsic stability of which seems an important factor in religious transmission. In the Fang example considered above, people who participate in the *nku melan* rituals also conserve relics of the ancestors' skulls. The material conservation of these relics, as well as their stable properties, should be integrated in an account of religious recurrence. In order to do this, however, it is important not to misconstrue the connections between such objects and the mental representations distributed in a group. A particularly damaging confu-

sion is introduced, in anthropology, by the use of the term "symbol" to denote these material tokens. It is all too tempting, for instance, to describe the Fang ancestor relics as "symbols" that have a particular "meaning" for members of the

groups that conserve them; the relics could be said to represent and in fact embody the awesome presence of the ancestors. This usage makes it particularly difficult to understand the cognitive processes involved. By themselves, the Fang *bieri* of course have no particular "meaning." Calling them "symbols" only alludes to the fact that their display generally leads Fang people to entertain certain representations that are more likely than others. This can happen only if these assumptions are more salient than others to start with. It is not in the "power" of external tokens to generate particular assumptions. Material tokens like the Fang *bieri* could be described more realistically as *cues*, which in particular situations, given a number of available assumptions, will direct people's attention to some of these assumptions.

Once we redescribe these "symbols" as cues that orient people's attention, we can understand that such cues are in fact abundant in the physical environment of any human group. The fact that most of them do not consist in artifacts, or are not intended to serve as "symbols," does not mean that they do not play a similar role. For instance, the Fang assumptions concerning the ghosts make a particular usage of liminal spaces and times. Ghosts are typically seen at dawn or dusk, in clearings in the forest. The special perceptual properties of such situations therefore provide cues, which often orient people's imagination toward the possible presence of ghosts. In this sense one could describe these physical properties as "symbolic" of the ghosts, if this did not show the vacuity of the term. Also, some artifacts can be used as cues, although they were never intended to be used for that purpose. In the past, lineage fission and cultivation patterns led the Fang to migrate periodically. They left behind deserted villages that are now considered particularly dangerous because of the presence of ghosts. Although there is no intention there, the abandoned village repeatedly provides cues as to the presence and possible manifestations of ghosts.

The reason we often misconstrue the nature and effects of material tokens is that we tend to interpret religious representations in an overly theologistic way. We spontaneously (and wrongly) assume that an explicit, written theology is a catalogue of all the assumptions that characterize a given religious environment. We then project this idea onto other types of social environments and assume that the material tokens (statues, relics, monuments, etc.) provide a fragmentary or abridged or

elliptical theology. This, however, is clearly misguided. The fact that a participant can "explain" the particular features of a statue, for example, should not be described as the fact that the statue has a particular "meaning." It indicates only that some features of the statue can be used as cues to select among a number of available assumptions.

Speculating further, one may wonder whether even explicit theologies are not another, admittedly special class of external cues. I have argued that we should not misconstrue material tokens as elliptical theologies. Conversely, it might be the case that theological productions are overextended cues for selection and strengthening. That is to say, theological texts could be considered as particular material objects, which differ from other material cues only in the specificity of the inferences made from them. What makes this seem strange is that we tend to ascribe "intrinsic meanings" to written texts. The Christian Gospels, for instance, explicitly "state" that God sent his son to redeem the sins of the mortals. It therefore seems natural enough to think that the text actually "contains" a particular meaning. This, however, is a commonsense understanding of communication, not a plausible cognitive description. What we mean by saying that the scripture "says" something is just that the inferences drawn from the text are highly predictable, more so than would be possible with any other type of external tokens. But in this as in all situations of communication, the properties of the external tokens under-determine their interpretation. Reading a text or hearing a sermon implies producing a series of nondemonstrative inferences, the content of which can be influenced, but not generated, by the properties of the sentences .realized. To sum up, the recurrence of religious representations is likely to be reinforced by the use of external tokens, inasmuch as the latter constitute a basis for the "cued recall" of particular assumptions. Written theologies, obviously, constitute an extreme point in regard to the specificity of the cues used. However, the recall and selection processes they make possible do not necessarily differ from those triggered by less complex, more "ambiguous" external tokens.

Conclusion

We often tend to think that cultural representations have some systematic connections, in the sense that they are integrated in *schematic* conceptual structures. In this chapter we examined two do-

mains in which it is clear that the assumptions activated are nonschematic and that the links between them cannot be described as deductive. In the "circles" of religious representations, particular identifications of persons activate assumptions about episodes, and the identification of episodes conversely activates assumptions about social categories. The inferences from action to social category, or vice versa, are not deductive. The criteria of truth applied to some types of religious utterances display similar features. They may seem to be founded on cultural axioms, on general schemata that specify which sources guarantee true statements. This, however, is again an illusion; the axioms are simply not there, and appear to be there only if we mistake the repeated application of a plausible explanation for an axiomatic principle.

A schematic understanding of religious assumptions leads to a question-begging description of short-term stability. Cultural "codes," "models," and "worldviews" are transmitted simply because they are established conceptual systems, which govern people's interpretation of particular situations. Conversely, this type of model makes cultural change incomprehensible, as far as cognitive processes are concerned. If people's inferences are constantly produced by a series of cultural axioms or schemata, it is difficult to understand how long-term trends could modify the distribution of particular representations. The only explanation for change then resides in external factors, such as migration or authoritarian imposition of new practices. This picture of cultural transmission, in which cognitive factors favor the stability of whatever assumptions are "in the air," while only social factors can initiate change, seems unduly restrictive and particularly poor in explanatory power. More realistically, I have presented a series of hypotheses that account for the impressive short-term stability of religious and other cultural assumptions. The "systematic" aspects of cultural representations, and their recurrence, can be partly explained as the result of strengthening processes. They will occur if the cognitive systems that acquire these representations are biased toward the use of salient assumptions.

9
Cultural Transmission and the Biology in History

In the course of the previous chapters, I put forward a series of specific claims regarding the representation and transmission of certain aspects of religious representations. These claims suggest a wider framework for the description of cultural transmission in general, which I will outline in this chapter. As ! pointed out in chapter 8, stability cannot be understood without first specifying as clearly as possible its scope, ontology, and process. The same remark applies to general processes of cultural transmission. This may seem self-evident, yet our common understanding of transmission is less than precise about these three matters. What is being transmitted must be properly identified, without using any *ad hoe* entities, the existence of which is justified only by their contribution to the theory. Also, the hypothesized process must require only empirically established causal connections; it should dispense with mysterious "black boxes" that generate precisely the observed phenomena. A theory that posits a causal link, without specifying what the link consists of, may well be nothing but a *magical* account of cultural transmission. Conversely, a theory that identifies a causal process in precise terms, but does not have the proper ontology, may well become *vacuous*, in that it provides a good explanation for phenomena that do not actually occur, or occur only in marginal domains. The point of this chapter is to examine in what way it is possible to describe general mechanisms of cultural transmission without resorting to vacuous or magical claims.

In the anthropological treatment of cultural transmission, we often tend to adopt a series of spontaneous assumptions that are seldom if ever explicitly defended in theoretical terms. One of my aims, throughout this book, was to show, in various domains of religious representations, how such pretheoretical notions can hinder a proper description of recurrence. First and foremost, a characteristic mistake is overestimating the *extent* of cultural transmission. We tend to take for granted that recurrent cultural material is recurrent precisely because it has been transmitted through social interaction; I called this the hypothesis of "exhaustive cultural transmission." As I said in chapters 1 and 4:, it is

important here to distinguish a true-but-trivial from a strong-but-implausible interpretation of the statement. Obviously, most cultural material observed in human groups has been acquired *in the context of* some form of social interaction. This, however, is not enough to warrant the conclusion that social interaction is the cause of cultural recurrence. To demonstrate this, we would have to show that differences in social interaction, during acquisition, cause corresponding differences in recurrent material. This is certainly the case for some aspects of cultural representations; we often assume that it must therefore be the same for all of them. I showed, on the contrary, that some aspects of cultural material are likely to recur whatever the social interaction in the context of which they were acquired. In this sense we can have cultural recurrence without cultural transmission. These recurrent aspects are important not only as such but also because they impose constraints on further, culturally transmitted features.

The *ontology* of recurrent features is equally vague, and equally misleading, in our common treatment of transmission. We assume that cultural representations should be described in supra-individual terms as constituting cultural models or worldviews. These are abstract objects, which are formally distinct from their representation in actual minds. Such descriptions are ontologically ambiguous. They make constant use of an intrinsically cognitive descriptive vocabulary ("ideas," "conceptions," "models," "norms," "rules," etc.) yet ignore actual cognitive processes. This is not too damaging in the ethnographic description of particular cultural "systems," in the sense that abstract terms are implicitly understood as heuristic devices, as rough generalizations over the mental states of individuals.1 In the explanation of recurrence, however,

1. To use M. Gilbert's terms, we could say that accounts of collective mental states are generally "summative"; they imply a commonsense interpretation, following which

(Footnote continued on next page)

the ontological ambiguity is particularly damaging. In this book, I avoided these ambiguities and described recurrence as a particular statistical phenomenon. The occurrence of a particular thought is a material event, in the sense that it reduces to a particular state of a particular brain. Abstract objects, by virtue of being abstract, cannot enter into causal relations with material events. Only other material states and events can. Other thoughts, and features of the environment including other people's behavior, are material states and events that can influence the occurrence of a particular thought. It makes no sense, or only very vague sense, to talk about a collective "worldview" influencing someone's behavior. Here I tried to specify the actual causal chain for particular aspects of religious representations, without using ontologically dubious postulated entities.

Finally, the *process* of cultural recurrence is not altogether clear in anthropological theory. We do have rich and significant studies of many aspects of the "socialization" process, but we have very little in terms of a general framework in which these empirical studies could be integrated. The assumption of "exhaustive cultural transmission" is often founded on the idea that cultural material is acquired in ways either too simple or too complex to be amenable to a theoretical description. We assume either that cultural representations are just "absorbed," "picked up," by universally receptive subjects or else that the actual processes are so numerous and complex that no single theory could encompass them. This is what gives many anthropological accounts of recurrence and transmission a strong magical flavor. This results from the combination of two factors: (1) abstract objects are described as having material effects, and (2) no account is given of the causal connections involved. In this sense, saying that "cultural models are somehow transmitted through socialization" is not very different from saying that "performing the ritual somehow makes the rains fall." Or, to be less polemical, it is very much like saying that "turning the ignition key somehow makes the engine start," which certainly constitutes a reliable principle, but hardly a theory of thermal engines.

In the previous chapters I showed how phenomena of recurrence can be approached in a very different way, as the outcome of particular

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the "collective belief that p," for instance, indicates only a relatively high incidence of the belief among the group. On the weaknesses of the summative account, see Gilbert 1992, 257-288.

selective constraints. I will now consider the general implications of this approach and discuss the various selective frameworks mentioned in chapter 1. Compared to the models of cultural anthropology, these frameworks have the immense advantage of being much more explicit in their postulates and hypotheses. This of course also makes their defects much easier to detect. Although my account of religious representations is, by and large, a particular application of these general models, I will try to show that they need some serious revisions if we want them to produce valuable results in the description of cultural phenomena. Ordinary anthropological models tend to err on the side of magic; conversely, evolutionary models need to be amended, lest they produce vacuous explanations.

Coevolution Theories

Here the generic label "coevolution" denotes a set of different theoretical frameworks, the main point of which is to provide a precise set of hypotheses for the description of cultural evolution and transmission. These theories originated in evolutionary theory and sociobiology. Their starting point is Campbell's intuition that the Darwinian notions of blind variation and selective retention can apply beyond genetic transmission, and that they constitute a powerful model in the description and explanation of creative thought as well as learning (Campbell 1960, 1970). A number of theoretical models were then developed on the basis of Campbell's original contribution. The coevolution paradigm can be characterized by four main features:

1. It is assumed that a proper understanding of cultural phenomena can be achieved by putting forward what I called in chapter I a *selective* model of cultural recurrence. As W. H. Durham puts it, "culture evolves through the *differential* transmission of ideas, values and beliefs in a population" (1991, 156, my emphasis). In other words, there is no need to postulate any *ad hoc* generative processes. The patterns observed can be explained more economically on the basis of biased or selective acquisition.

2. This type of selective explanation makes it possible to account for macro-properties of cultural phenomena without postulating any supra individual entities. The statistical tools developed in pop-

ulation genetics and epidemiological theory are powerful enough to describe those large trends and patterns which anthropologists sometimes mistake for real objects in the world ("cultures," "religions," and the like). As C. J. Lumsden and E. O. Wilson argue, such patterns can be characterized as "ethnographic probability distributions" (1981,344)

If there is such a thing as cultural evolution through selective retention, a crucial problem is to understand the connection between that process on the one hand, and genetic transmission on the other. More specifically, one central question is to understand to what extent the processes underlying cultural transmission have been shaped by the evolutionary history of the species. The coevolution treatment of this question is based on two additional assumptions:

3. Cultural phenomena cannot be treated as part of the environment of gene selection, as ecological conditions and other such contingent factors are treated. This is because the transmission of cultural information depends on features of the organisms themselves, such as their learning and decision-making capacities. These phenotypic features are not strictly speaking part of an environment, since they are constrained by the genome of the species.

4. Conversely, coevolution theories reject the assumption of some early sociobiological models, following which the recurrence of cultural traits is a direct consequence of their inclusive fitness value for the organisms that carry them. This form of genetic determinism typically results in what Lumsden and Wilson call a "black box" approach to the connections between gene selection and cultural evolution (Lumsden and Wilson 1981, 343; see also Boyd and Richerson 1985, 12-13), in which it is taken for granted that stable cultural traits confer a more or less direct inclusive fitness advantage. This proposition, however, is neither supported by sufficient evidence, in most cases, nor sufficiently specified in its causal mechanism. L. L. Cavalli-Sforza was among the first authors to point out that one cannot understand cultural evolution unless one distinguishes clearly between the inclusive fitness value of a cultural phenomenon (the advantage to its bearers in terms of transmission of their genotype) and its potential for cultural transmission (Cavalli-Sforza and Feldman 1973), a point that is now generally agreed upon (Delius 1991, 90ff.).

Here I cannot give more than a concise survey of the frameworks in question. Instead of giving a proper historical or logical reconstruction of the coevolution paradigm, I will concentrate on three particular models, as a starting point for a more complete understanding of cultural transmission. As a result, some historically important models are omitted here simply because most of their substance was incorporated in subsequent models. Among those early developments, I must mention Cavalli-Sforza's sophisticated models of transmission, which gave co-evolution theories a precise mathematical grounding (Cavalli-Sforza and Feldman 1973,1981), as well as Dawkins's suggestive account of culture as transmission of contagious "memes," which gave a clear qualitative formulation of the basic intuitions of the paradigm (Dawkins 1976). This fragmentary presentation of coevolution is intended to highlight theoretical achievements and difficulties of particular relevance to the specific problems treated in this book.2

Selection Through Epigenetic Rules

Let me begin with Lumsden and Wilson's particular account of coevolution.3 The starting point of this model is the definition of a unit of cultural transmission called "culturgen" and characterized mainly in comparison with the archaeological notion of an artifact type. A culturgen is a "relatively homogeneous set of artefacts, behaviors or mentifacts (mental constructs having little or no direct correspondence with reality)" (1981, 27). Culturgens are *functional units* of cultural transmission. That is to say, any sets of behaviors or representations or external objects can be considered to form a single culturgen, inasmuch as they function as a single integrated object in the transmission process. In some cases the culturgen is a single, isolated behavioral trait, in others a complex of related features. In this respect the characterization of

2. A thorough, historically and logically organized description of the various frameworks can be found in Durham 1991, 155-183. Here I have not followed his division between single inheritance, dual inheritance, and full-blown coevolutionary models, though this is obviously a central feature. Other differences between the models are more pertinent for our argument.

3. Some elements of the framework were put forward, in a very rough form, in Wilson 1975. A first illustration of the theory, on the connections between incest rules and optimal rule-breeding, is given in Lumsden and Wilson 1981. See Lumsden and Wilson 1982 for a useful summary and a discussion, some points of which have inspired my treatment.

culturgens is analogous to that of genes, which are units only from a functional viewpoint (1981, 30).

Human "cultures" evolve, that is, change and stabilize certain patterns, mainly because of differential choices in the transmission process. Lumsden and Wilson do not dwell on the characterization or explanation of the various contingent factors that introduce variants in the available pool of culturgens. Yet, their models provide a description of the factors likely to stabilize variants. Central among these constraints are what they call "epigenetic rules," that is, universal features of human organisms which are likely to "channel the development of an anatomical, physiological, cognitive or behavioral trait in a particular direction" (1981, 370). Examples of epigenetic rules typically illustrate those universal perceptual and conceptual capacities which constitute the substratum of cultural elaboration. Lumsden and Wilson illustrate the point by describing universal properties of color perception, taste and smell, the structuring of the phonological field, face recognition, nonverbal (particularly emotional) communication, mother-infant bonding, fears and phobias (e.g., snakes and heights), incest avoidance between siblings, and even general cognitive tendencies such as inductive heuristics (1981, 38-50 and 71-89). These are only illustrations, however, and many other epigenetic rules of this kind are likely to have a direct causal role in an account of cultural selection.

In this model, cultural patterns result from the contribution of epigenetic rules to two aspects of culturgens, their penetrance and their selectivity. Penetrance is the likelihood that human subjects can attend to a given class of culturgens, and selectivity the likelihood that they will make particular choices between available variants (1981, 64). For instance, the perceptual system makes it possible to attend to color terms in general as relevant features of external objects (penetrance); it also makes particular sets of terms, around perceptual loci, more likely to be learned and therefore stabilized (selectivity).4 Beyond selection, other processes contribute to the stabilization of culturgens, notably the re-

ification and symbolization processes whereby patterns of mental activity are represented or interpreted as external objects. The main point of the

4. This account is a simplified version o£ the model. Lumsden and Wilson make a principled distinction between "primary" and "secondary" epigenetic rules, which correspond (roughly) to basic and more complex perceptual-cognitive mechanisms. Although this distinction plays an important role in the equations describing selective transmission, it is not crucial to the logic of this framework, and in many ways it seems to be less than perfectly clear in cognitive terms.

theory is that the combined effects of epigenetic rules on many different minds, in a given population, can be described precisely in terms of statistical models. The "combined action of many minds seems to lead to the emergence of patterns of culture that are statistically predictable" (1981, 357), in other words to the cultural phenomena as observed and described by anthropologists.

Dual Inheritance and Biased Transmission

R. Boyd and P. J. Richerson's quantitative models of cultural transmission are based on the notion of "dual inheritance." Behavior is constrained by two parallel, structurally analogous inheritance tracks, that of genes and that of cultural information.5 Population genetics is the main source of inspiration here, and it provides the statistical models that constitute the core of the theory. Here, as in my account of Lumsden and Wilson, I will concentrate on the theoretical premises of the framework, leaving aside their precise mathematical formulation. As we will see below, the advantages and uncertainties of coevolution theories are largely independent of the specific mathematical models.

The model differs from Lumsden and Wilson's account in several major assumptions. First, Boyd and Richerson do not think that cultural information can be, or indeed need be, divided into elementary units such as "culturgens" or Dawkins's "memes." Instead, they refer to "cultural traits" that are functionally characterized as whatever *behavioral* characteristic can be influenced by social learning; the transmitted information that guides behavior is called the "cultural repertoire" of the individual (1985, 33). Also in contrast to Lumsden and Wilson, Boyd and Richerson provide a fine-grained description of mechanisms of change as well as stabilization. According to them, five main "forces" are likely to shape cultural evolution (1985, 9ff.):

1. Random variation, that is, accidental mutations introduced by transmission errors such as misremembering.

2. Loss of variants in small samples, that is to say "an analog of genetic drift." If a population of variants becomes too small, then chance frequency variations in the occurrence of the variants can have

5. Again, I am using the most easily available source (Boyd and Richerson 1985), while earlier versions of the model and more specific arguments can be found in Richerson and Boyd 1978, 1984.

dramatic effects on transmission, such as complete disappearance of certain variants.

3. Guided variation: "Like many other organisms, humans adjust their phenotypes in response to their environments through learning and rational calculation. Unlike most other organisms, humans can culturally transmit the phenotypes so acquired to the next generation."

4. Biased transmission, which occurs "because the process of cultural transmission itself can favour certain cultural variants over others." I will return to this important point below.

5. Natural selection: the choice of cultural variants sometimes has effects on the inclusive fitness of the culture bearers. If for instance it decreases their fitness beyond a certain point, then the elimination of the bearers will entail the disappearance of the cultural variant itself.

The notion of "biased transmission" is clearly the most important concept in the framework, and it is the object of particularly sophisticated models. Boyd and Richerson distinguish between three types of bias (1985, 10-11). *Direct bias* occurs when people adopt variants on the basis of their judgments about the value of those variants themselves. Culturally specific dietary preferences for instance are transmitted in this way. *Frequency dependent bias* occurs when the spread of a cultural trait among a population has consequences for its adoption by subsequent generations. A familiar if trivial frequency bias phenomenon is the tendency of social groups, on the whole, to adopt traits that are already frequent in cultural parents; in some circumstances, however, frequency biases can be reversed and favor the adoption of cultural rarity. Finally, *indirect bias is* a fundamental feature of cultural transmission; here a trait is adopted, not because of intrinsic properties, but because in the population of cultural parents it is commonly found in association with another cultural trait that is favored.

A standard illustration of indirect bias can be found in the tendency to choose as models successful or prestigious individuals among one's cultural parents, even for features that are not causally related to the success (1985, 245ff.). This tendency makes good adaptive sense in a variety of habitats. In the absence of complete information about the best strategies in a given habitat, it is demonstrably rational to imitate successful individuals, thereby increasing one's chance of success at a minimal cognitive cost (1985, 287). This form of indirect bias is also important

because, as the formal models show, it can typically result in a "runaway process"; the preferred traits are stabilized and sometimes exaggerated, whatever their contribution to the actual success of the individuals, even in cases where they are actually maladaptive (1985, 259ff.).

To sum up, biased transmission and particularly the indirect bias models provide the tools necessary to account for the nonfunctional character of many cultural traits. As Boyd and Richerson put it, "the traits on which the selection of models is based can become quite irrelevant to ordinary adaptive advantages" (1985, 294). The background of this notion, and of Lumsden and Wilson's epigenetic rules, is that powerful forces of cultural evolution can be found in the transmission process, notably in the psychological capacities that make it possible. This latter point is not examined in great detail by Boyd and Richerson, who mainly focus on the aspects of prestige and success as the origins of biased transmission. As we will see presently, however, there are good reasons to think that indirect bias is a crucial mechanism of cultural transmission.

A Global Coevolution Model: Genes and Ideational Units

Let me now consider the synthesis of coevolution put forward by Durham.6 The framework differs from other coevolution theories in that Durham makes use of a vast anthropological literature and is generally more familiar with actual cultural transmission than other authors. The main points of the theory, which I will try to sum up here, are illustrated in extreme detail. Each one of these case studies deserves a detailed discussion, which cannot be given here.

A starting point in this account is a characterization of the units of cultural transmission which avoids the recurrent ambiguity between representations and actual behavior. For Durham, Dawkins's "memes" must be redefined as information that (1) actually guides behavior, (2) is susceptible of hierarchical integration, and (3) is differentially transmitted as coherent units (1991, 188). Earlier coevolution theories are criticized for their persistent confusion between the transmission of cultural information and the frequency of behavior based on that information. The "cultural fitness" of memes can be defined as their "suitability for replication and use within the cultural system of a given

6. The complete framework is presented in Durham 1991, which supersedes earlier formulations (Durham 1978, 1979).

subpopulation" (1991,194). Cultural selection, which is the differential transmission of variants, cannot be described purely in terms of an analogy with either genetic selection or epidemiological trends; important structural differences make such analogies unproductive. A crucial feature of cultural selection is the role played by decision making, that is, by evaluation of possible consequences of culturally guided behavior. This implies both "primary values," that is, a set of

genetically driven propensities toward certain rewards, as well as "secondary values," socially acquired expectations concerning the possible consequences of behavior (1991, 200). In other words, Durham is trying to introduce in the coevolution paradigm features of cultural transmission which are generally ignored, such as the integration of cultural information in labeled systems, the forms of social interaction that modify transmission, and the existence of both choice and imposition in the evaluation of models. Durham criticizes in particular epidemiological models of cultural transmission ("cultural contagion") for ignoring the crucial role of human choice, which includes forced choices in coercive conditions, in the shaping of cultural evolution (1991, 197).

This complexification and its background in the study of actual cultural phenomena are best illustrated in Durham's description of the connections between genetic and cultural transmission (1991,437ff.). There are, first, two *interactive* modes, in which the fitness value of a certain unit in either cultural or genetic selection has direct effects on its fitness in the other domain:

1. *Genetic mediation*. For instance, genetic predispositions (what Lumsden and Wilson would call "epigenetic rules") make certain color terms easier to acquire and therefore more recurrent. In this case cultural fitness is genetically mediated.

2. *Cultural mediation*. Conversely, the genetic fitness value of certain practices can be mediated by cultural "memes." This is the case in the practice of adult milk consumption in high latitudes, which is fostered by a variety of myths and beliefs, and results in a higher frequency for the genes that allow adult lactose absorption.

The remaining three modes are *comparative* modes, in which gene and meme selection processes have no direct effect on each other, but both contribute to behavioral evolution:

3. In the *enhancement* mode, gene and meme selection processes converge in favoring certain types of behavior. For instance, cul-

tural beliefs about incest taboos on the one hand, and the genetic constraints of optimal outbreeding on the other, converge in the exclusion of siblings as potential sexual partners.

4. In the *neutral* mode, cultural selection strongly favors certain features that do not affect the inclusive fitness of their carriers. For instance, language acquisition strongly favors the accurate reproduction of the phonological landscape of a language, which has no influence on inclusive fitness.

5. In the *opposition* mode, cultural selection gives a great cultural fitness to behaviors that actually threaten the inclusive fitness of the actors, by endangering the carriers themselves and/or decreasing their reproductive success. Durham illustrates this kind of mal-adaptive practice with the case of *kuru*, a degenerative disease of the nervous system endemic among the Fore of Papua New Guinea, which is spread mainly through the culturally selected practice of endo-cannibalism.7

With this synthetic framework, Durham aims to show that "culture does constitute a bona fide inheritance system in its own right" (1991, 159). Both Lumsden and Wilson's and Boyd and Richerson's models were chiefly about what Durham calls "coevolution in the narrow sense," that is, the direct interaction between genetic features and cultural constraints. For Durham, the explanation of cultural diversity requires that we examine cultural selection in a broader perspective, that is, including many domains in which there is no direct interaction between the two inheritance systems. This is why the "comparative" modes are particularly important. They provide models for situations in which cultural evolution is constrained by intrinsic factors, which justify a study of cultural transmission as such.

Uncertainties of Coevolution

In judging the success and problems of coevolution theories, it may be of help to return to the criteria used at the beginning

7. Durham, however, is noticeably cautious in his approach to the opposition mode, and warns against the temptation to include in this category most cases of dangerous practices, notably warfare. In many cases such

practices have few genuinely maladaptive consequences and therefore belong to the neutral mode.

of this chapter, as regards the scope, ontology, and process of cultural transmission. Coevolution theories are obviously more sophisticated than classical anthropological models in their approach to the process of cultural evolution. Instead of postulating generative causal mechanisms that would justify the occurrence of specific cultural phenomena, they take biased transmission, that is, selective retention, as the sufficient cause of observed patterns. In terms of ontology, too, there is an obvious advance in the systematic rejection of ad hoc abstract entities such as "societies," "cultures," "cosmologies," or "worldviews." As I indicated in chapter 1, the proliferation of such entities in anthropology often stems from a lack of familiarity with statistical inference. Here, on the contrary, we are dealing with statistically informed models, in which salient trends can be explained without being reified.

Despite this progress, coevolution theories still include ambiguous and problematic claims regarding the ontology of transmission and, by way of consequence, its scope as well. Although they constitute a departure from the overly expensive ontology of classical anthropology, they do not yet provide a satisfactory account of transmission. In the following pages I will first discuss the ontological aspects of coevolution, which will then make it possible to put forward a more accurate description of the scope and cognitive aspects of transmission.

Units, Replicators, and Vehicles

Coevolution theories, being inspired by biological models, all start from the assumption that transmission must be construed as the replication of some unit of information. Theorists vary in the extent to which they want to pursue the analogy between genes and the putative units of cultural information, but the central claim is always there. Cultural material can be approached as made up of functionally characterized information units. Characterizations of the particles in question, however, are often rather ambiguous. Cultural units, called "memes" or "culturgens" or "cultural traits," are described as having varying degrees of integration (they may be simple rules or complex aggregates) and interaction (their effect on phenotypes may be influenced by other cultural units). To a certain extent, this reflects the flexibility of the notion of gene, which is always functionally defined. Beyond this, however, a vague characterization of cultural units does have damaging consequences for a theory of transmission. This is not just a matter of "metaphysical" debates about the ontology of culture. As

J. H. Barkow points out, "the fruitful problem is whether treating culture as particulate orders data, advances theory, or leads to testable hypotheses" (1989, 250). My point here is that extant descriptions of the cultural particles are more likely to hamper theory and speculation than advance them, particularly because of the persistent ambiguity between observable cultural phenomena and mental representations.

In order to see this, it may be of help to make use of the biological distinction, expressed in particularly clear terms by Dawkins, between replicators and vehicles (1982, 114ff.). On one hand, replicators are units that survive in the sense that they can produce copies of themselves. Genes, clearly, are replicators. On the other hand, the various devices used for the replication of genes, such as organisms, are the vehicles of replicators: "A vehicle is any unit, discrete enough to seem worth naming, which houses a collection of replicators and which works as a unit for the preservation and propagation of those replicators .... A replicator's success is measured by its capacity to survive in the form of copies" (Dawkins 1982, 114).8 As we will see presently, it is not entirely clear that the notions of replicator and vehicle can be directly transferred to a description of cultural transmission. The distinction, however, makes it possible to describe in a more precise way some of the problems of coevolutionary accounts. A theory of transmission focuses primarily on two types of objects, mental representations on the one hand and behavioral patterns on the other. There are, then, three ways of construing what happens in cultural transmission:

1.Behavioral patterns are the replicators, and mental representations are among the vehicles that make replication possible. This seems to be, for instance, the position taken by Boyd and Richerson; they focus on the recurrence of behavioral traits, and they take mental processes, such as the choice of models, for instance, as among the processes through which replication is achieved.

2.Mental representations are the replicators, and behaviors are among the objects that make their replication possible, in other words, among the vehicles. I will examine and defend this specific research program in the rest of this chapter. Cultural transmission is considered here as one of the processes whereby a replication of

8. It must be noted that Dawkins himself believes that not too much ontological weight should be given to the notion of "vehicle." In genetic as well as cultural transmission, it would be a fallacy to think that vehicles are necessarily solid autonomous objects (such as organisms). The notion is used here, as in Dawkins, simply as a convenient tool, to make the exact nature of the replicators more easily understood.

certain representations take place.9 This is congruent with Durham's statement that "culture evolves through the differential transmission of ideas, values and beliefs in a population" (1991, 156); what is being transmitted or replicated is identified unambiguously as mental representations.

3.Mental representations and behavioral patterns can function indifferently as replicators or vehicles for each other. This seems the only possible way of understanding, for instance, Lumsden and Wilson's definition of culturgens as sets of"artefacts, behaviors or mentifacts" (1981, 27). Here both representations and behaviors seem to function as replicators and vehicles.

Although I gave some quotations to illustrate each of these possible stances, it would be misleading to suggest that the question is treated in such a clear and straightforward manner in coevolution theories. If anything, these frameworks are extremely unclear about the ontological distinction between mental and behavioral objects, and about their functions as replicators or vehicles. These ambiguities probably have their source in the notion of "information" which is central to coevolution theories, and which was imported with all its vagueness from evolutionary biology. When Durham for instance defines cultural units as "information that actually guides behavior" (1991, 188), this can be interpreted as denoting either information stored in brains (as Durham himself implies) or as information in the information-theoretic sense, which in this case can be located anywhere in the world.10 Information in the information-theoretic sense is an abstract quantitative concept, whose application to actual systems is never simple and straightforward; moreover, the connections between information and mental representations are an even more complicated matter.11 It is hardly surprising that these difficulties should be compounded in the description of a little-known system like cultural transmission.

What matters here, obviously, is not so much the origin of the ontological ambiguity as its effects on actual theories. As we will see

9. As we will see in the next section, this is also very much what Dawkins had in mind in his original formulation of "memes" as cultural replicators (Dawkins 1976).

10. In many species recurrent behavior is triggered by information "stored" in the physical environment. A yearly cycle of reproductive behavior, for instance, can be triggered by changes in the relative lengths of day and night. In this case the "information that actually guides behavior" is partly located in astronomical cycles.

11. For a precise explanation of both types of problems, see F. Dretske 1981, 41-62 and 171-189.

below, coevolution models are sometimes based on rather implausible descriptions of cultural acquisition and transmission. This, I would argue, is a consequence of the lack of a definite and consistent approach to the ontology of cultural replication units. What makes the theories questionable is not that they make the wrong choice among the three "positions" outlined above; rather, the problem stems from the fact that (1) the authors are not consistent in the choice they seem to advocate, and (2) they do not envisage all the consequences of that choice. This leads to two interconnected aspects of the models, which ! will call, in a slightly polemical way, the "preformation" and "phenocopy" assumptions.

Preformation and Phenocpy

The term "preformation" denotes a type of account of biological reproduction which was particularly popular in classical, pre-evolutionary theories. The theory states that germ cells can develop into full organisms because they contain a tiny copy, a "pre-formed" miniature of the organism, with all its constituent parts, limbs, organs, and so on. Ontogeny is then conceived as a straightforward growth of the miniature into a full-size copy. Modem biology replaced the notion of preformation with that of a genetic program, in which a DNA sequence carries, not a "copy" of an organism but detailed instructions for the manufacture of proteins, a process that in most cases results in the growth of the normal adult organism. The central fallacy of a preformarion account is to think that there must be a structural similarity between genotype and phenotype. Because there are long necks and four legs in adult giraffes, there must be some long-necked and four-legged aspects in the giraffe's reproductive cells.

In this precise sense of structural similarity, it seems that coevolution theories do assume some form of preformation in cultural material.12 As I said above, there is often some ambiguity as to which type of objects is described in coevolution accounts of transmission. This applies not

12. Note, in case the argument appears too polemical, that there is nothing intrinsically absurd about preformation, which after all is supported by aspects of ontogenetic development directly available to commonsense experience. The notion of a genetic "program" is far less intuitive and could not be adopted without a considerable refinement in the understanding of genetic "instructions." Putting forward a preformation account of development, in either biological or cultural domains, is therefore not a symptom of intellectual deficiency or perversity, but the sign of a preference for simple and intuitively plausible explanations.

only to the general formulations but also to the examination of particular examples. This ambiguity cannot be imputed to the elementary mistake of confusing mental representations and their behavioral outcome. It stems from the implicit assumption following which, since there is a structural similarity between the two domains, explaining the features of one of them amounts to explaining the features of the other. This idea of structural similarity was present from the onset in coevolution accounts; in Dawkins's early description of "memes," it was not very clear whether these cultural replicators should be construed only as mental representations.13

The "preformation" assumption is a strong (and I think wrong) hypothesis about the way mental contents are realized in overt behavior. Let me now turn to the converse question, concerning the way subjects acquire cultural representations on the basis of their observation of other people's behavior. Here most coevolution theories seem to take for granted what I will call the "phenocopy" assumption, that cultural "memes" are replicated by copying features of the vehicles; recurrent mental representations consist in the mental copy of recurrent observable behavior.14 This, obviously, is just the converse assumption to the preformation hypothesis. If both are true, then subjects observe salient features of other people's behavior, and produce a mental copy in the form of a memory trace, which then directs their behavior, which is itself a copy of the mental representation.

Both preformation and phenocopy are generally taken as unproblematic in coevolution theories. For instance, Lumsden and Wilson write that "culturgens act via relational networks in long-term memory, and in many instances can be identified with them" (1981, 27, my emphasis), a statement that is echoed by Boyd and Richerson's straightforward assertion that "culture is acquired by directly copying the phenotype" (1985, 8). Even Dawkins, whose account of cultural memes is generally subtle, comes dangerously close to the preformation-phenocopy stance

13. As Dawkins himself acknowledges, "I was insufficiently clear [in Dawkins 1976] about the distinction between the meme itself... on the one hand, and its 'phenotypic effects' or 'mcrae products' on the other. A meme should be regarded as a unit of information residing in a brain" (1982, 109).

14. Applied to genetic inheritance, this would mean that gene cells include a copy of the organism that carries them. This is why the assumption can be called "phenocopy," although this is not the standard use of the term. My usage, however, stems from a debate on "phenocopy" and learning which was part of the Piaget-Chomsky debate on innateness and cognitive development: see Danchin's and Jacob's contributions in Piatelli-Palmarini 1980.

when he states that "the phenotypic effects of a meme... are the outward... manifestations of the memes in the brain. They may be perceived by the sense organs of other individuals, and they may so imprint themselves on the brains of the receiving individuals that a copy (not necessarily exact) of the original meme is graven in the receiving brain" (1982, 109). As we will see presently, these ideas of "copy" and "imprinting" are both suggestive and misleading, as far as cultural transmission is concerned.

Two factors contribute to make this combination of "preformation" and "phenocopy" apparently unproblematic. First, coevolution theories have inherited from cultural anthropology a strongly empiricist view of cultural acquisition and cognitive development in general. That is to say, coevolution models and classical anthropology share the idea that most important aspects of cultural phenomena are determined by what is acquired through social interaction. Also, coevolution theorists sometimes construe the difference between genetic and cultural transmission as analogous to that between Darwinian and Lamarckian evolution. Whereas genetic inheritance does not allow the transmission of acquired traits, cultural transmission is seen as intrinsically Lamarckian in that the experience of a generation can be passed on to the next and become part of the replicated cultural material. This is a recurrent theme in the coevolution literature. For Boyd and Richerson for instance, there is "a kind of 'Lamarckian' evolution [in cultural traits], in the sense that acquired variation is inherited" (1985, 8). Dawkins, too, mentions Lamarck in his description of the differences between gene and meme selection; contrary to what happens in genetic evolution, "there may be 'Lamarckian' causal arrows leading from [meme]-phenotype to [meme]-replicator, as well as the other way around" (1982, 112).

Against The Preformation Phenocopy Model

The "preformation" assumption may derive some of its persuasive power from the type of examples or typical cultural objects that provided suggestive illustrations for the notion of memes. Dawkins for instance took the example of musical tunes (e.g., Auld Lang Syne) as self-replicating units that use people's brains as vehicles and sometimes undergo partial modifications; these, like genetic mutations, make it more likely that the unit will survive in the form of copies. This kind of example is both suggestive and misleading, in that it takes as a paradigm

a rather exceptional situation in which the structural similarity assumption is almost plausible from a cognitive viewpoint. When listening to other people's musical performances, people create a memory trace that may well have, to a certain extent, some structural similarities to what is actually performed. Their memory of the tune may have parts and subparts, and tonal and harmonic relations, that duplicate some of the objective properties of the external phenomenon. This is probably not a very good account of the memorization of tunes, but let us assume for the sake of argument that there is some plausibility in the notion of structural similarity here. If this is the case, then there is indeed a kind of "preformation" in musical performance: the behavior displays features and relations that were contained in the mental representations activated.

This kind of situation, however, may be the exception rather than the rule in cultural transmission. For many types of recurrent cultural features, there is strictly speaking no structural similarity between the mental representations and the behavior patterns that result from them. Take for instance the extreme case of the "transmission" of linguistic competence. Speakers of a natural language have at generation n some representations about syntactic structures which are strikingly similar to those entertained by generation n- 1. At each generation, we can explain the recurrent syntactic patterns by positing a number of tacit rules, mentally represented in some form or other. There is, however, no structural similarity between these rules and the syntactic patterns they generate. People do not produce sentences by copying some ready-made mental template from a catalogue of well-formed formulas. The assumption of structural similarity would be equally absurd in the other direction, in the understanding of utterances. Parsing a sentence does not mean producing a structurally equivalent copy of it, but inferring a syntactic description that is under-determined by the linguistic input. Sentences do not display their full syntactic structure; this is manifest in ambiguous cases like "flying planes can be dangerous," which can be parsed in (at least) two different ways. To sum up, we have here an example of a set of mental representations (grammatical competence) which is perhaps the clearest case of near-perfect self-replication. Yet subjects acquire it mostly on the basis of actual utterances, whose regular patterns have no structural similarity with the replicated features.

Obviously, the "transmission" of grammatical competence is a limiting case, in the sense that it consists in the acquisition of a competence, of a behavioral capacity rather than a behavior, and that it can be ideally

described as the acquisition of a system of rules. The transmission of catchy tunes (if we accept Dawkins's description) is another limiting case; the replicated units might be produced by a copying device that only maps mentally represented songs onto singing behavior. The fallacy of "preformation" consists in assuming that the transmission of cultural representations, by and large, is more similar to the song-copying operation than to the development of linguistic competence.

At various points in the course of this book, I showed that it is impossible to account for cultural recurrence if we stick to the "exhaustive cultural transmission" paradigm. Take for instance the essentialistic understanding of social categories, described in chapter 6. This type of situation shows to what extent the preformation-phenocopy assumption misses the most crucial aspects of cultural transmission. The recurrent cultural phenomenon, the "replicator," in this case, is the essentialistic interpretation of a social category, for example, of the category BEYEM among the Fang. This, however, is not "transmitted" by being displayed. People's utterances about beyem for instance do not express the general essentialistic assumptions, of which most people are not aware anyway; what they often express are various consequences of those assumptions. So there is no similarity in structure or content between the replicated cultural element and the vehicle that makes its replication likely. Conversely, it cannot be said that people acquire an essentialistic understanding of such a category by (however indirectly) "copying the phenotype." The names of social categories, the typical features associated with them, the ostensive designation of exemplars, the type of statements people make about the categories, all these elements of the cultural input under-determine the essence-based understanding. The latter consists in a set of inferences which, given certain circumstances, constitute the most salient interpretation of the categories.

More generally, in the various registers of religious assumptions studied here, we have seen that the cultural input under-determines recurrent features; it provides a series of cues that trigger spontaneous inferences in human subjects. The fact that those inferences are often roughly similar implies that they are constrained by cognitive structures that are common to all these subjects. These cognitive structures, however, cannot be described as "cultural" or culturally transmitted, since differences in cultural environment do not seem to have any major effects on their content or developmental schedule. From the (correct) observation that there is no generative system in "culture," coevolution theories seem to have implicitly adopted the alternative model, following

which copying is the only characteristic of communication that is relevant to cultural transmission. This, however, is not really plausible. In the domains described in this book, and in fact in many domains of cultural transmission, we encounter a process that is not amenable to the "copying process" nor to the "triggered generative capacity" models. It consists of a more complex mechanism, which I will outline in the rest of this chapter.

Replication Or Contagion?

The particular difficulties of coevolution theories may stem from some central and unstated assumptions of the framework, notably from the notion of replication that provides the starting point of all the theories mentioned here. Comparisons with genetic inheritance sometimes lead to the assumption that the units of cultural material ("memes") can be found in exactly similar forms in various minds. This dovetails with the classical anthropology tendency to assume that people who live in the same cultural environment "share" a number of ideas. However, this notion of replication, despite its heuristic advantages, may convey misleading assumptions as concerns cultural acquisition. This is sometimes acknowledged in coevolution theories, but the consequences of this fact are not really considered. Dawkins's notion of "memes" for instance is one of the crucial building blocks of coevolution models. Dawkins himself argues repeatedly that one should not postulate a straightforward analogy between the replication of genes and that of memes. The main difference lies in the fact that every transmission event is likely to modify a cultural "meme." The communication of ideas does not usually consist in a straightforward transfer of mental content from one brain to another.

Taking this point seriously leads inevitably to questioning the per-tinence of the very notion of replication. This is the main point of Sperber's sketch of an "epidemiology of representations," conceived as a possible alternative to current

coevolution theories (Sperber 1985a, 199!). In this model the metaphor of replication is entirely abandoned and replaced with an account of cultural communication that is more akin to a process of contagion in a population. The theory starts from the assumption, common in coevolution theories, that a human population can be construed as inhabited by a population of mental representations. Some of these give rise to public representations, such as gestures, artifacts, or utterances. Sperber departs from coevolution in

assuming that communication processes, including the understanding of public representations like utterances, are fundamentally inferential, not semiotic processes. Producing an utterance, or any other kind of public representation, cannot consist in producing a coded version of the mental representation communicated. It consists in producing publicly available tokens that, in the communicator's expectations, are likely to modify the audience's mental representations in a roughly predictable way. As a consequence, there is no such thing as "replicating" thoughts through communication: "what human communication achieves in general is merely some degree of resemblance between the communicator's and the audience's thoughts. Strict replication, if it exists at all, should be viewed just as a limiting case of maximal resemblance" (Sperber 1991, 30). This insistence on inferential processes is congruent with the psychological data presented in this book and is shown to be crucial to cultural acquisition. Recurrent mental representations, as I tried to show at various points, are not directly expressed by the cultural input; rather, they are inferred from that input on the basis of preexisting conceptual structures. To sum up, we cannot conceive cultural phenomena as a population of replicators. The only claim that can be made on the observation of recurrent representations is that "those representations that are repeatedly communicated and minimally transformed in the process will end up belonging to the culture" (Sperber 1991, 30).

Although Sperber's argument is only programmatic, it contains important elements that may help us go beyond the uncertainties of co-evolution models. It is also much closer to the conclusions derived from the present study of religious representations, as we will see presently. The replication model, far from giving a satisfactory understanding of cultural recurrence, makes it difficult to understand its psychological underpinnings, and therefore to describe the connections between genetic and cognitive constraints. Yet "epidemiological" or "contagion" models place at the center of the argument the cognitive processes of communication and acquisition.

Conclusion: Cultural Recurrence with a Rich Psychology

Let me now give a final description of the overall framework that underlies this study. I will first consider the general premises

of the model, notably in contrast with current coevolution frameworks. I will then turn to a summary of the specific hypotheses put forward to account for the recurrence of religious representations; these give an example of the type of model that is generated by applying the general premises to a limited domain of cultural representations. Finally, I will consider some implications of this

particular study for a more global approach to cultural recurrence, particularly as concerns the crucial question of the connections between genetic and cultural constraints.

Premises Of An Enriched Selective Framework

The study of religious representations which constitutes the core of the present book is based on the following hypotheses:

Recurrence of mental representations. The phenomenon we must describe and explain is the recurrence of particular mental representations in different minds, or more precisely the recurrence of the activation of particular assumptions. In accordance with coevolution theory, there is no need here to postulate any expensive *ad hoc* entities such as "systems of thought" or "worldviews" to account for cultural recurrence. The aggregation of probabilistic activation, in different minds, is sufficient to account for the patterns usually described in terms of supra-individual cultural trends.

Similarity is not identity. It is also necessary to point out that the similarity between different people's assumptions does not entail that their contents are identical. As Sperber points out, communication results not in replication but in convergence between different subjects' representations. Besides, similar assumptions may be activated through different inferential paths, have different connections to other assumptions, and therefore not count as identical.

There is no such thing as behavioral transparency. As I argued at several points, nothing observable (utterances, gestures, material tokens) can be considered the direct, unmediated display of mental representations. Utterances and gestures are given intentional interpretations though a complex inferential process. In the same way, cultural "reifications of ideas" (such as paintings, texts, buildings) never really

reify any idea but constitutes cues likely to trigger similar inferences in a population of subjects.

These premises characterize the implicit ontology of the framework. They have important consequences for the scope of cultural transmission and the process of cultural recurrence in general. Two of these consequences must be mentioned now, though they will be examined in more detail presently:

Cultural recurrence is not coextensive with cultural transmission. The recurrence of particular cultural representations may not be entirely amenable to a description in terms of cultural transmission, because available cultural stimuli (the "cultural input") typically under-determine adult cultural competence. To be more precise, theoretically relevant properties of cultural representations may be under-determined by cultural transmission. This point was illustrated repeatedly in the course of the book, in various domains of religious representations.

Theoretical economy requires a rich psychology. Both classical anthropological models and coevolution theories tend to rely on simplistic hypotheses, as far as cultural acquisition and cognitive development are concerned. Some authors seem to assume that, in the context of a theory of cultural transmission, it is more economical to describe subjects as unprejudiced inductivists than to import rich models from cognitive psychology. However, the study of religious representations shows to what extent this relies on a misguided notion of theoretical parsimony. From both psychological and evolutionary viewpoints, theories founded on an impoverished description of cognitive structure do not have sufficient descriptive and explanatory power.

These very general principles delineate a psychologically richer approach to cultural recurrence that may avoid some of the difficulties of current coevolution models. Beyond these principles, it remains to put forward specific hypotheses regarding the recurrence of particular types of cultural representations and the role of cultural transmission in this phenomenon of recurrence. At this point we must remember that there is no need to take for granted, as is the case in most coevolution theories, that a single, unified "mechanism" accounts for cultural recurrence. Different aspects of cultural phenomena may be recurrent by virtue of different causal mechanisms. The fact that we intuitively lump them together as "cultural" does not result from theoretical necessity, but from our commonsense categories, which are not always the best guide

to actual underlying causal mechanisms. This is why we must now turn to the specific hypotheses put forward in this volume concerning the recurrence of important aspects of religious representations. I will then try to show to what extent these limited hypotheses can shed light on more general cultural phenomena and perhaps take us further toward a general understanding of cultural recurrence.

Religious Recurrence: Five Hypotheses

The central question of this book is, How can we account for the recurrence, in very different cultural environments, of particular aspects of religious ideas? A central hypothesis is that this phenomenon should be approached in terms of constraints on acquisition. Certain aspects of religious representations, because of these constraints, are more likely to be entertained and transmitted. Another central hypothesis was that of domain specificity. There is no reason to think that all

types of mental representations are amenable to the same constraints. Beyond these general principles, I have put forward a number of hypotheses about recurrent religious representations, which can be summarized as follows:

Ontological assumptions: the cognitive optimal. Religious ontological assumptions generally comprise a culturally transmitted part, which violates intuitive expectations, and a tacit, schematic part, which confirms them. Assumptions of this type are likely to be more recurrent if they reach a cognitive optimum, in which (1) the violation clearly marks off the putative entity or agency from ordinary objects and beings, and (2) the confirmation imposes maximal constraints on the range of inferences that can be drawn from cultural cues.

Causal assumptions: abductive inferences constrained by intuitive ontologies. Religious causal assumptions are only another aspect, or a direct consequence, of the ontological assumptions. Culturally transmitted causal claims are generally nonschematic, and they are entertained to the extent that (1) they are tacitly enriched by (and therefore constrained by) intuitive ontological assumptions, and (2) they can provide abductive explanations for particular situations. Because they consist in abductive inferences, they are entertained not as "cultural axioms" but only as problem-driven explanatory conjectures.

Social essentialism. Certain religious social categories are constrained by schematic conceptual structures. The most important one is the essentialist principle following which an underlying, unob-servable resemblance between members of a kind is causally responsible for (nonnecessary, nonsufficient) external resemblance. This contrasts with other domains of social categories, where intuitive principles are available (kinship for instance) and also with the kind of institutional criteria put forward by certain religious institutions.

Ritual episodes: behavioral modality and enrichment of memorized scripts. Rituals are manifestations of a particular behavioral modality (or complex of modalities) that makes possible the performance of scripts represented in a particular way. The causal-intentional structure of the script, as well as the background conditions underlying the identification of the episode, are under-specified. This fragmentary script representation is then filled with conjectural abductive assumptions, for example, about the participants' social categories, or the properties of the extra-natural agencies concerned.

Stability and cross-strengthening. The stability of certain nonschematic assumptions can be explained by their contribution to abductive inferences concerning other assumptions. For instance, general assumptions about episode types are strengthened by particular identifications of persons, while in other contexts general assumptions about person types are strengthened by particular identifications of episodes. In a similar way, the identification of particular sources of truth activates and strengthens various assumptions about social categories and types of episodes. This abductive usage increases the probability that a given set of assumptions will be selected as relevant for abductive explanations in subsequent contexts. It therefore increases the probability of homeostatic distributions of representations, that is, of short-term stability.

Extensive Epigenetic Constraints

The most salient feature of these hypotheses is the use of *a rich* psychology. I did not try to present an artificially simplified picture of psychological capacities, or to reduce them to a set of general-purpose learning mechanisms or heuristics. On the contrary, I showed that the acquisition and transmission of religious representations requires a series of complex, highly organized specific capacities. The psychology is rich

in the sense that it comprises many domain-specific mechanisms, which apply only to finely discriminated domains of reference. It is also rich in the sense that its effects on acquisition and memorization are not trivial, and in fact are often counterintuitive. Needless to say, none of the hypotheses about psychological capacities is based on *ad hoc* claims; they are all supported by independent experimental evidence.

This aspect of the model leads us to the central question of the connections between cognitive and genetic constraints in

the explanation of recurrence. Paradoxically, coevolution theories often lead to an unsatisfactory treatment of this question. To return to Durham's model, for instance, among the five modes of connections between genetic and cultural inheritance systems, it is clear that the "neutral mode" (1991, 437; see above) in fact applies to most "culturally central" aspects of cultural environments. That is to say, cultural evolution for those domains is seen as neither oriented nor limited by genetic constraints. This corresponds to a commonsense view of human culture, which sees its central properties as genetically neutral. There is, obviously, some truth in this account, inasmuch as most aspects of cultural phenomena are neutral from the viewpoint of inclusive fitness. As J. Delius puts it (1991, 90), "pointed rather than round collar tips, two- rather than three-button jackets seem unlikely to make any difference to the survival and the reproduction of the wearer." This of course extends to religious ideas; although they are often more salient and culturally significant than the number of buttons on a jacket, they do not seem to make much difference to inclusive fitness.

Should we then accept that the "neutrality" mode is a proper characterization of the connection between genetic and cognitive constraints? I think the answer is no as far as religious representations are concerned; by extension, the answer is likely to be negative as well in the study of cultural recurrence in general. In order to see why, it may be of help to use and extend a notion that was crucial to early coevolution models, the concept of "epigenetic rules" introduced by Lumsden and Wilson. These rules were defined as very general constraints, brought about by the evolutionary history of the species, which orient and limit the human mind's attention and reaction to particular ranges of stimuli. As a consequence, the mind "tends to organize itself into certain forms in preference to others" (1981, 357). However, Lumsden and Wilson's illustrations of epigenetic rules are rather limited (see above) and do not seem to have much influence on the selection of complex cultural representations. The reason for this limitation may lie in the implicit

assumption of "structural similarity" criticized above. Lumdsen and Wilson consider only those epigenetic constraints for which there is an obvious congruence between the genetically constrained proclivities and the observable cultural recurrence. For instance, color stimuli are perceived in terms of categorical perception, around particular loci in terms of intensity, hue, and saturation. Correspondingly, the most recurrent color categories in natural languages are typically identified with those foci. Here there is a manifest congruence between the particular sensitivity constrained by the genome on the one hand, and its expression in cultural representations on the other.

The notion of epigenetic constraints, however, should be extended to cover cases in which a genetically constrained sensitivity has *indirect* effects on cultural phenomena. That is to say, epigenetic rules have important effects beyond the particular sensitivity they produce in human subjects. These effects, which may appear indirect, are in fact fundamental for an understanding of cultural representations. This extended understanding of epigenetic constraints is in fact the most important conclusion to emerge from our description of religious representations, and it must be described in more detail.

Let me start with a simple example from the religious ontologies discussed in chapter 4. The tacit belief that extra-natural agencies have ordinary mental powers is among the most common religious assumptions. It can be found in the most diverse cultural environments, and to some extent it provides the basis of our commonsense understanding of what a supernatural agency is. As I showed here, the complex network of psychological assumptions which directs our understanding of gods' and spirits' behavior does not need to be culturally transmitted. It is already present in most human subjects, in the form of an intuitive mentalistic framework, which accounts for other people's behavior in terms of beliefs and desires. Other recurrent aspects of religious assumptions are amenable to the same description. Although they express counterintuitive claims about religious episodes, causal connections, and social categories, they are tacitly founded on the rich inferential background provided by intuitive domain-specific principles. The existence and precise contents of these intuitive knowledge structures are not an *ad hoc*: postulate of my anthropological framework. They were established independently of any anthropological argument, by means of psychological experiments.

In the course of my description I have left aside the important question of the origin of these knowledge structures. If their main principles

are independent from experience, and therefore relatively unaffected by cultural differences, how can we account for

their recurrence? A natural hypothesis is that they are, to a large extent, genetically constrained properties of human minds. Their appearance in the course of cognitive development can be construed as a maturational property of human brains. This of course does not mean that their development could occur in the absence of particular stimuli. Intentional explanations of behavior could not appear if the social environment of the child did not include people acting on the basis of intentions. In the same way, normal adult locomotion would not appear in the absence of the relevant gravitational stimuli. The main point about the "maturational" interpretation is that intuitive principles are likely to appear in a variety of environments which encompasses all human environments known so far.

The main argument for this interpretation is of course the extraordinary cross-cultural stability of intuitive principles. There is just no evidence in cross-cultural investigations, despite the anthropological bias toward difference and the tendency to over-emphasize it, for the existence of cultural environments that would do without a mentalistic spontaneous psychology or an ontological divide between artifacts and living beings or an essentialistic understanding of living kinds. Beyond this, additional arguments for genetic constraints on intuitive knowledge can be provided by strictly evolutionary arguments. That is to say, it can be shown that such intuitive principles may have been of great advantage in the course of human evolution. There would have been advantages in the appearance of specialized cognitive capacities, independent of experience; moreover, there would have been an evolutionary advantage in their having the precise properties we can now observe in universal cognitive capacities.

The Perspective Of Evolutionary Psychology

In order to understand what specific capacities were likely to confer inclusive fitness benefits on their bearers, we must turn to the emerging field of *evolutionary psychology*, as defined notably by L. Cosmides and J. Tooby (Cosmides 1985,1989; Tooby and Cosmides 1989; Cosmides and Tooby 1989). The main assumption of evolutionary psychology is that human evolution, in the adaptation to typical Pleistocene conditions, has favored the appearance of genetic constraints

leading to particular conceptual sensitivities.15 These "Darwinian algorithms" may include many of the specialized cognitive capacities that we can now observe in human subjects. Cosmides, for instance, has shown how certain reasoning biases, such as the familiar "confirmation bias" in hypothesis testing, could be related to the requirements of social exchange in small bands of Pleistocene hunter-gatherers (Cosmides 1985). Two features of such conceptual sensitivities must be emphasized here, features that have to do with their domain-specific nature and their consequences for cultural recurrence.

Genetically constrained capacities are likely to consist of a number of specialized domain-specific mechanisms: "evolutionary considerations render it highly implausible that the psyche consists of a single or a small number of domain-general general purpose mechanisms" (Tooby and Cosmides 1989, 31). This is another argument for the stability and cross-strengthening hypothesis stated above, following which an impoverished psychology is not theoretically parsimonious. Most explanations of cultural evolution assume that cultural acquisition consists in the application of simple learning heuristics to a variety of conceptual domains. This simplifying hypothesis, far from being economical, is in fact more costly, from both the psychological and the evolutionary viewpoints. In cognitive terms, explaining conceptual development in a purely empiricist fashion, as I pointed out several times in the course of this book, is a problematic enterprise. A common way of defending an empiricist account is to say that the subjects do not need a very rich set of presumptions because they live in richly structured environments. To put it in the usual terms, the environment is described as providing enough "affordances" to orient an unbiased inductive device toward the "right" categorization. This, however, does not eliminate the need for prior presumptions; on the contrary, for each set of affordances, one of course needs a sensitivity to precisely those aspects of the environment. It is in fact a very reliable rule of thumb in studies of cognitive development that richness in affordances and richness in prior structures are likely to be directly rather than inversely proportional. The more cues are offered by the environment, the more triggers have to be there, specifically sensitive to those cues. From an evolutionary viewpoint, too,

15. Note that human evolution took place in a particular environment, with particular ecological constraints and economic and social structures, which do not correspond to any modem conditions. This is why it is absurd to discuss the evolutionary aspects of typically modem conditions or institutions. Modem conditions do not span a long enough period to have had any substantial genetic impact.

it does not make sense to think that the "capacity for learning culture" is an undifferentiated learning ability. In order to have a genuinely unbiased learning device, prepared to generalize inductively about whatever features of the environment are available, a species needs to develop a high-level cognitive system, with great flexibility in perceptual repertoires and categorization potential. This of course entails a high evolutionary cost, which has to be met by an equally high evolutionary advantage. It is not clear, however, that the benefit accrued by developing such a high-level system could not be provided by a series of low-level specialized mechanisms, which are less costly to develop. Besides, our pride in higher intellectual capacities often leads us to ignore the fact that they can be an impediment as much as an advantage, at crucial junctures in an organism's life. Faced with a predator or a prey, an organism is much better off relying on specialized, low-level, fast cognitive devices, rather than on general reasoning capacities. This is especially true if the general capacities in question are genuinely unbiased. Since the environment provides indefinitely many features to represent and generalize upon, an unbiased system would inevitably be overloaded with indefinitely many representations and categorizations, most of which are irrelevant to its survival.

Another characteristic of genetically constrained sensitivities is essential for our understanding of cultural recurrence. These specialized mechanisms have constraining effects beyond the domain of reality to which they primarily apply. This is the case of all the intuitive principles I have described in this book. For instance, the mentalistic intuitive psychology is chiefly directed at other people's behavior, for which it provides spontaneous and generally good explanations. There are strong evolutionary reasons why human beings should be innately endowed with principles that give them such a good predictive grasp of their partners' and enemies' behavior. This powerful mentalistic structure also has consequences concerning the description of other aspects of reality, beyond human behavior. It makes it particularly easy to develop and communicate an intentional understanding of animal behavior (which may be partly right) and of such things as clouds and storms (which is entirely wrong). In the same way, the universal essentialistic understanding of animal species may have had, in the course of evolution, a strong adaptive advantage. It makes it particularly easy to infer the typical behavior of a certain species from the observation of a single exemplar. Such generalizations may well be wrong from time to time, but their cost/benefit outcome is dearly on the positive side. They yield suffi-

ciently accurate predictions, in crucial domains like hunting and protection from predators, at a very low cognitive cost; one can therefore assume, at least as a starting point, that the capacity is genetically constrained. Again, however, once the cognitive sensitivity is there, it may be applied to domains beyond the prediction of animal behavior, as our description of certain social categories demonstrates. To sum up, the fact that a cognitive mechanism is functionally specialized in certain stimuli does not preclude its extension to other aspects of reality. Evolution made it the case that certain types of stimuli are a sufficient condition for triggering domain-specific inferences, but it did not always make it a necessary condition.

This, I would argue, is the crucial point of a psychologically realistic explanation of cultural recurrence. Genetically constrained sensitivities are likely to give rise to what Boyd and Richerson described as a type of "runaway" process. Far from being an exceptional or marginal phenomenon, this is in fact the typical process whereby cultural features are made recurrent. Human evolution has resulted in the development of particular intuitive principles, geared to particular domains or aspects of the natural and social environment. Whatever cultural input can trigger some of these intuitive principles is likely to be more easily acquired and communicated, thereby giving rise to the recurrent features of cultural phenomena. Cultural recurrence (including the recurrence of religious representations) is therefore the outcome of a runaway process in the iterative application of epigenetic constraints.

Epilogue: The History in History

In this book I considered "religion" from a particular angle. My aim was to account for the recurrence of particular types of mental representations. I chose to consider religious assumptions as examples of mental representations, the recurrence of which, in different human minds, is clearly above chance. Obviously, religious representations instantiate indefinitely many generalizations, and therefore could be seen from different angles. However, once the recurrence of particular

aspects is chosen as the phenomenon we want to account for, not all conditions can be taken as causally relevant. I showed that genetic and cognitive constraints on acquisition and transmission are among the causes of the observed recurrence, whereas all other aspects can be

counted as background conditions, as far as this particular explanatory goal is concerned. For instance, the kind of economic and ecological conditions in which human groups live seems to be of little if any pertinence here. True, human subjects need to stay alive and interact with other subjects, in order to acquire or maintain religious ideas. There is no indication, however, that changes in the way subsistence and exchange are organized could be correlated to changes in, for example, the recurrent connections between religious and intuitive ontologies.

My particular explanatory theory seems to leave aside, as contingent background factors, many of the features anthropologists actually observe and describe in their monographs, as well as most of the features that religious participants would consider crucial. This, however, should not be taken as implying that these aspects are "unimportant," "trivial," or "secondary." It means only that variations in those conditions do not bring about corresponding variations in the aspects we want to explain. A cognitive theory of religion, particularly a theory aiming to explain cultural recurrence, is indeed at odds with humanistic interests in that it focuses on aspects that human subjects do not generally find of any practical or cognitive interest, if they are aware of them at all. This is not unusual in a scientific project. Physics is uninterested in most humanly "interesting" aspects of matter; syntactic theory disregards what people use language for; and scientific psychology is mostly indifferent to that crucial aspect of the human psyche, interpersonal differences. Lack of humanistic "significance" or interest is often the price to pay for causal relevance.

My aim in describing cognitive constraints was to shed light, at least in a limited domain, on the important role of human biology, understood here in a broad sense as comprising all genetically constrained capacities and their consequences, in human history. There is a widespread reluctance to this type of argument in cultural anthropology, which often takes for granted that "culture" is an autonomous level of reality, which cannot be "reduced" to psychological or biological constraints. This argument, in all its philosophical vagueness, often stems from a less-than-satisfactory understanding of what evolutionary constraints really are, and of the difference between genetic constraints and genetic determinism. Conversely, the ontologically expensive notion of "culture" as an independent level of reality often results from a blind spot regarding what could be called the history in human history. I have described many aspects of cultural representations as background conditions, given the explanatory goals of a cognitive theory. They are not,

however, part of the background as far as historical descriptions are concerned. The particular cultural features that provide the "contingent input" for the cognitive mechanisms I described are all part of the history of specific groups. They cannot be conceived as timeless abstract structures, as is often the case in cultural anthropology. Nor can we consider their chronological evolution as simply a series of frozen frames spread over time. Time is not just a matter of succession here but is also a matter of causal connections, a point that an overinflated notion of "culture" tends to obfuscate. By dispensing with the ontologically vague, quasi-mystical notion of "culture," it is possible to have a clearer understanding of these two types of causal structures that are likely to account for particular cultural phenomena, namely the biological history of the species, to which this book aimed to contribute, and the historical history of human groups.

REFERENCES

Abelson, R. P.

1981. Psychological status of the script concept, *American Psychologist* 36 (7):715-729.

Alexander, R.

1979. *Darwinism and human affairs*. Seattle: University of Washington Press.

1987. *The biology of moral systems*. Hawthorne, N.Y.: Aldine Publishing Co.

Anderson, J. R.

1983. *The architecture of cognition*. Cambridge, Mass.: Harvard University Press.

Armstrong, S. L.; Gleitman, L. R.; and Gleitman, H.

1983. What some concepts might not be, *Cognition* 13:263-308.

Astington, J. W.; Harris, P.; and Olson, D. R., eds.

1988. *Developing theories of mind*. Cambridge: Cambridge University Press.

Atran, S.

1985. The nature of folk-botanical life-forms, *American Anthropologist* 87:298-315.

1987. Ordinary contraints on the semantics of living kinds: A commonsense alternative to recent treatments of natural-object terms, *Mind and Language* 2:27-63.

1989. Basic conceptual domains, *Mind and Language* 4:5-16.

1990. *Cognitive foundations of natural history: Towards an anthropology of science*. Cambridge: Cambridge University Press.

Avis, J., and Harris, P. L.

1991. Belief-desire reasoning among Baka children: Evidence for a universal conception of mind, *Child Development* 62:460-467.

Baillargeon, R.

1987. Young infants' reasoning about the physical and spatial characteristics of a hidden object, *Cognitive Development* 2:179-200.

Baillargeon, R., and Hanko-Summers, S.

1990. Is the object adequately supported by the bottom object? Young infants' understanding of support relations, *Cognitive Development* 5:29-54.

Barkow, J. H.

1984. The distance between genes and culture, *Journal of Anthropological Research* 3:33-49.

1989. *Darwin, sex and status: Biological approaches to mind and culture*. Toronto: Univerity of Toronto Press.

Barsalou, L. W.

1983. Ad hoc categories, *Memory and Cognition* 11:211-227.

1987. The instability of graded structure: Implications for the nature of concepts. In *Concepts and conceptual development: Ecological and intellectual factors in categorization*, ed. U. Neisser. Cambridge: Cambridge University

Press.

Barth, F.

1975. *Ritual and knowledge among the Bakataman of New Guinea*. New Haven, Conn.: Yale University Press; Oslo: Universitetsforlaget.

Beattie, J.

1970. On understanding ritual. In *Rationality*, ed. B. Wilson. Oxford: Basil Blackwell Publisher.

Beildelman, T. O.

1971. Nuer priests and prophets: Charisma, authority and power among the Nuer. In *The Translation of Culture*. London: Tavistock.

Berger, P. L., and Luckman, T.

1967. *The social construction of reality*. London: Allen Lane.

Berlin, B.; Breedlove, D.; and Raven, P.

1973. General principles of classification and nomenclature in folk-biology, *American Anthropologist* 75:214-242.

Berofsky, B.

1971. *Determinism*. Princeton, N.J.: Princeton University Press.

Black, M.

1962. Metaphor. In *Models and metaphors*, ed. M. Black. Ithaca, N.Y.: Cornell University Press.

1979. More about metaphor. In *Metaphor and thought*, ed. A. Ortony. Cambridge: Cambridge University Press.

Bloch, M.

1974. Symbols, song, dance, and features of articulation: Is religion an extreme form of traditional authority? *European Journal of Sociology* 15:55-81.

1985. From cognition to ideology. In *Power and knowledge: Anthropological and sociological approaches*, ed. R. Fardon. Edinburgh: 'Scottish Academic Press.

1986. *From blessing to violence: History and ideology in the circumcision ritual of the Merina of Madagascar*. Cambridge: Cambridge University Press.

1989. *Ritual, history and power: Selected papers in anthropology*. London: Athlone Press.

1992.
Prey into hunter: The politics of religious experience. Morgan Lectures. Cambridge: Cambridge University Press.

Boyd, R.

1980. Materialism without reductionism: What physicalism does not entail. In *Readings in the philosophy of psychology*, ed. N. Block. Cambridge, Mass.: MIT Press.

1984. Natural kinds, homeostasis and the limits of essentialism. Paper presented at Cornell University, Ithaca, N.Y.

Boyd, R., and Richerson, P. J.

1985. *Culture and the evolutionary process*. Chicago: University of Chicago Press.

Boyer, P.

1986. The 'empty' concepts of traditional thinking: A semantic and pragmatic description, *Man, n.s*., 21:50-64.

1987. The stuff 'traditions' are made of: On the implicit ontology of an ethnographic category, *Philosophy of the Social Sciences* 17:49-65.

1988. *Barricades mysterieuses et pièges à pensée*. Paris: Société d'Ethnologie.

1990. *Tradition as truth and communication: A cognitive description of traditional discourse*. Cambridge: Cambridge University Press.

1991. Causal thinking and its anthropological misrepresentation, *Philosophy of the Social Sciences* 22:187-213.

1992. Explaining religious ideas: Elements of a cognitive approach, *Numen* 39:27-57.

1993a. Introduction: Cognitive aspects of religious symbolism. In *Cognitive aspects of religious symbolism*, ed. P. Boyer. Cambridge: Cambridge University Press.

1993b. Pseudo-natural kinds. In *Cognitive aspects of religious symbolism*, ed. P. Boyer. Cambridge: Cambridge University Press.

Brooks, L. R.

1978. Non-analytic concept formation and memory for instances. In *Cognition and categorization*, ed. E. Rosch and B. B. Lloyd. Hillsdale, N.J.: Lawrence Erlbaum Associates.

1987. Decentralized control of categorization: The role of prior processing episodes. In *Concepts and conceptual development: Ecological and intellectual factors in categorization*, ed. U. Neisser. Cambridge: Cambridge University Press.

Brown, C. H.

1984. *Language and living things: Uniformities in folk-classification and naming*. New Brunswick, N.J.: Rutgers University Press.

Brown, M.

1985a. Individual experience, dreams and the identification of magical stones in an Amazonian society. In *Directions in cognitive anthropology*, ed. J. Dougherty. Urbana-Champaign: University of Illinois Press.

1985b. *Tsewa's gift: Magic and meaning in an Amazonian society*. Washington, D.C.: Smithsonian Institution Press.

Bruner, J. S.; Goodnow, J. J.; and Austin, G. A.

1956. *A study of thinking*. New York: John Wiley and Sons.

Bullock, M.

1985a. Animism in childhood thinking: A new look at an old question, *Developmental Psychology* 21:217-225.

1985b. Causal reasoning and developmental change over the preschool years, *Human Development* 28:169-191.

Bullock, M.; Gelman, R.; and Baillargeon, R.

1982. The development of causal reasoning. In *The developmental psychology of time*, ed. W. J. Friedman. New

York: Academic Press.

Campbell, D. T.

1960. Blind variation and selective retention in creative thought as in other knowledge processes, *Psychological Review* 67:380-400.

1970. Natural selection as an epistemological model. In *A handbook of method in cultural anthropology*, ed. N. Naroll and R. Cohen. Garden City, N.Y.: Chapman and Hall.

Carnap, R.

1950. *Logical foundations of probability*. London: Routledge and Kegan Paul.

Cavalli-Sforza, L. L.

1986. Cultural evolution, *American Zoologist* 26:845-855.

Cavalli-Sforza, L. L., and Feldman, M. W.

1973. Cultural versus biological inheritance: Phenotypic transmission from parents to children, *American Journal of Human Genetics* 25:618-637.

1981. *Cultural transmission and evolution: A quantitative approach*. Princeton, N.J.: Princeton University Press.

Churchland, P.M.

1981. Eliminative materialism and propositional attitudes, *Journal of Philosophy* 84:544-555.

Cohen, L. J.

1977. *The probable and the provable*. Oxford: Clarendon Press.

Cohen, R.

1981. Evolutionary epistemology and human values, *Current Anthropology* 22:201-218.

Coleman, L., and P. Kay

1981. Prototype semantics: The English verb, *Lie, Language* 57:26-44.

Cooper, D. E.

1986. *Metaphor*. Oxford: Basil Blackwell Publisher.

Cosmides, L.

1985. *Deduction or Darwinian algorithms? An explanation of the "elusive" content effect on the Wason selection task*. Ph.D. diss., Harvard University, Cambridge, Mass.

1989. The logic of social exchange: Has natural selection shaped how humans reason.? Studies with the Wason selection task, *Cognition* 31:187-276.

Cosmides, L., and Tooby, J.

1989. Evolutionary psychology and the generation of culture, part 2, *Ethnology and Sociobiology* 10:51-97.

D'Andrade, R.

1987. A folk-model of the mind. In *Cultural models in language and thought*, ed. D. Holland and N. Quinn. Cambridge: Cambridge University Press.

Davidson, D.

1975. Causal relations. In *Causation and Conditionals*, ed. E. Sosa. London: Methuen.

Dawkins, R.

1976. *The selfish gene*. New York: Oxford University Press.

1982. *The extended phenotype*. San Francisco: W. H. Freeman and Co.

Delius, J.

1991. The nature of culture. In *The Tinbergen legacy*, ed. M. S. Dawkins, T. R. Halliday, and R. Dawkins. London: Chapman and Hall.

Dennett, D.

1978. *Brainstorms: Philosophical essays on mind and psychology*. Hassocks, Sussex: Harvester Press; Cambridge, Mass.: MIT Press.

1987.
The intentional stance. Cambridge, Mass.: MIT Press.

DiSessa, A.

1988. Knowledge in pieces. In *Constructivism in the computer age*, ed. G. Forman and P. B. Pufall. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Dretske, F.

1981. *Knowledge and the flow of information*. Oxford: Basil Blackwell Publisher.

Durham, W. H.

1978. The coevolution of human biology and culture. In *Human behaviour and adaptation*, ed. V. Reynolds and N. B. Jones. London: Academic Press.

1979. Toward a co-evolutionary theory of human biology and culture. In *Evolutionary biology and human social behavior*, ed. N. A. Chagnon and W. Irons. Belmont, Calif.: Wadsworth.

1991. *Coevolution: Genes, culture and human diversity*. Stanford, Calif.: Stanford University Press.

Durkheim, E.

1964 [1915]. *The elementary forms of the religious life*. London: George Allen and Unwin.

Durkin, K.

1987. Minds and language: Social cognition, social interaction and the acquisition of language, *Mind and Language* 2:105-140.

Ellen, R F.

1979. Omniscience and ignorance: Variation in Nuaulu knowledge, identification and classification of animals, *Language in Society* 8:337-364.

Endicott, K

1979. *Batek Negrito religion: The world-view and rituals of a hunting and gathering people of peninsular Malaysia*. Oxford: Clarendon Press.

Evans-Pritchard, E. E.

1937. *Witchcraft, oracles and magic among the Azande*. Oxford: Clarendon Press.

1940.
The Nuer. Oxford: Clarendon Press.

Fabrega, H., and Silver, D. B.

1973. *Illness and shamanistic curing in Zinacantan: An ethnomedical analysis*. Stanford, Calif.: Stanford University Press.

Fernandez, J. W.

1982. *Bwiti: An ethnography of the religious imagination in Africa*. Princeton, N.J.: Princeton University Press.

1986. *Persuasions and performances: The play of tropes in culture*. Bloomington: Indiana University Press.

Firth, R.

1967. *The work of the gods in Tikopia*. London: Athlone Press; New York: Humanities Press.

Fivush, R.

1987. Scripts and categories: Interrelationships in development. In *Concepts and conceptual development: Ecological and intellectual factors in categorization*, ed. U. Neisser. Cambridge: Cambridge University Press.

Fodor, J. A.

1987. *Psychosemantics: The problem of meaning in cognitive science*. Cambridge, Mass.: MIT Press.

1990. *A theory of content and other essays*. Cambridge, Mass.: MIT Press.

Fortes, M.

1966. Religious premises and logical technique in divinatory ritual, *Philosophical Transactions of the Royal Society of London* 251:409-422.

1987. *Religion, morality and the person: Essays on Tallensi religion (ed. Jack Goody*). Cambridge: Cambridge University Press.

Fox, J. J., ed.

1988. *To speak in pairs: Essays on the ritual languages of Eastern Indonesia*. Cambridge: Cambridge University Press.

Fuller, C. J.

1985. Initiation and consecration: Priestly rituals in a South Indian temple. In *Indian religion*, ed. R. Burghart and A. Cantlie.London: Curzon Press.

Gardner, D. S.

1983. Performativity and ritual: The Mianmin case, *Man, n.s*., 18:346-360.

Geach, P.

1969. *God and the soul*. Oxford: Clarendon Press.

Geertz, C.

1973.
The interpretation of culture. New York: Basic Books.

1983. *Local knowledge: Further essays in interpretive anthropology*. New York: Basic Books.

Gellner, E.

1969. *Saints of the atlas*. London: Weidenfeld and Nicolson.

1979. *Spectacles and predicaments: Essays in social theory*. Cambridge: Cambridge University Press.

1985. *Relativism and the social sciences*. (ed. I. Jarvie and J. Agassi). Cambridge: Cambridge University Press.

1988. *Plough, sword and book: The structure of human history*. London: Collins and Harvill.

Gelman, R.

1990. First principles organize attention to and learning about relevant data: Number and the animate-inanimate distinction as examples, *Cognitive Science* 14:79-106.

Gelman, R., and Baillargeon, R.

1983. A revision of some Piagetian concepts. In *Handbook of child psychology, vol. 3: Cognitive development*, ed. J. H. Flavell and E. M. Markham. New York: John Wiley and Sons.

Gelman, R.; Spelke, E.; and Meek, E.

1983. What preschoolers know about animate and inanimate objects. In *The acquisition of symbolic skills*, ed. D. Rogers and J. A. Sloboda. London: Plenum.

Gelman, S.

1988. The development of induction within natural kind and artefact categories, *Cognitive Psychology* 20:65-95.

Gelman, S., and Markman, E.

1986. Categories and induction in young children, *Cognition* 23:183-209.

1987. Young children's inductions from natural kinds: The role of categories and appearances, *Child Development* 58:3241.

Ghiselin, M. T.

1973. Darwin and evolutionary psychology, *Science* 179:964-968.

Gigerenzer, G., et al.

1989. *The empire of chance*. Cambridge: Cambridge University Press.

Gilbert, M.

1992. *On social facts*. Princeton, N.J.: Princeton University Press.

Goldman, A. I.

1986. *Epistemology and cognition*. Cambridge, Mass.: Harvard University Press.

Goodman, N.

1954. *Fact, fiction and forecast*. Cambridge, Mass.: Harvard University Press.

1972. Seven strictures on similarity. In *Problems and projects*. Indianapolis, Ind.: Bobbs-Merrill Co.

Goody, J. R.

1961. Religion and ritual: The definitional problem, *British Journal of Sociology* 12:142-164.

Goswami, U., and Brown, A. L.

1989. Melting chocolate and melting snowmen: Analogical reasoning and causal relations, *Cognition* :35:69-95.

Graesser, A. C.; Gordon, S. E.; and Sawyer, J. D.

1979. Recognition memory for typical and atypical actions in scripted activities: Tests of a script pointer + tag hypothesis, *Journal of Verbal Learning and Verbal Behaviour* 18:319-332.

Graesser, A. C.; Woll, S. B.; Kowalski, D. J.; and Smith, D. A.

1980. Memory for typical and atypical actions in scripted activities, *Journal of Experimental Psychology (Human Learning and Memory*) 6:503-515.

Hallpike, C. R.

1979. *The foundations of primitive thought*. Oxford: Clarendon Press.

Harris, P., and Heelas, P.

1979. Cognitive processes and collective representations, *European Journal of Sociology* 20:211-241.

Hart, H. L. A.; and Honore, T.

1959. *Causation in the law*. Oxford: Clarendon Press.

Heelas, P., and Lock, A.

1981. *Indigenous psychologies: The anthropology of the self*. New York: Academic Press.

Hirschfeld, L. A.

1986. Kinship and cognition: Genealogy and the meaning of kinship terms, *Current Anthropology* 27:235.

1988. On acquiring social categories: Cognitive development and anthropological wisdom, *Man* 23:611638.

1989. Rethinking the acquisition of kinship terms, *International Journal of Behavioural Development* 12:541-568.

Holland, J. H.; Holyoak, K. J.; Nisbett, R. E.; Thagord, P. R.

1986. *Induction: Processes of inference, learning and discovery*. Cambridge, Mass.: MIT Press.

Hollis, M., and Lukes, S., eds.

1982. *Rationality and relativism*. Oxford: Basil Blackwell Publisher.

Holy, L., and Stuchlik, M.

1983. *Actions, norms and representations: Foundations of anthropological inquiry*. Cambridge: Cambridge University Press.

Horton, R.

1960. A definition of religion and its uses, *Journal of the Royal Anthropological Institute* 90:43-62.

1982. Tradition and modernity revisited. In *Rationality and relativism*, ed. M. Hollis and S. Lukes. Oxford: Basil Blackwell Publisher.

Hume, D.

1748. *An enquiry concerning human understanding*. London. [1980: ed. L. A. Selby-Bigge, Oxford: Clarendon Press.]

Humphrey, C., and Laidlaw, J.

1993. *Archetypal actions: A theory of ritual as a mode of action and the case of the Jain puja*. Oxford: Clarendon Press.

Humphreys, P.

1989. *The chances of explanation*. Princeton, N.J.: Princeton University Press.

Ingold, T.

1986. *Evolution and social life*. Cambridge: Cambridge University Press.

Jahoda, G.

1982. *Psychology and anthropology*. London: Academic Press.

Jarvie, I. C., and Agassi, J.

1967. The problem of the rationality of magic, *British Journal of Sociology* 18:5-74.

Kahnemann, D.; Slovic, P.; and Tversky, A., eds.

1982. *Judgment under uncertainty: Heuristic and biases*. Cambridge: Cambridge University Press.

Kaiser, M. K.; Jonides, J.; and Alexander, J.

1986. Intuitive reasoning about abstract and familiar physics problems, *Memory and Cognition* 14:308-312.

Kant, I.

1790. *Kritik der Urteilskraft*. Königsberg.

Kapferer, B.

1983. *A celebration of demons: Exorcisms and the aesthetics of healing in Sri Lanka*. Bloomington: Indiana University Press.

Keesing, R.

1984. Rethinking *mana, Journal of Anthropological Research* 40:137-156.

1985. Conventional metaphors and anthropological metaphysics: The problematic of cultural translation, *Journal of Anthropological Research* 41:201-217.

1990. Exotic readings of cultural texts, *Current Anthropology*30:459-477.

Keil, F. C.

1979. *Semantic and conceptual development*. Cambridge, Mass.:Harvard University Press.

1986. The acquisition of natural kind and artefact terms. In *Conceptual change*, ed. A. Marrar and W. Demopoulos. Norwood, N.J.: Ablex.

1987. Conceptual development and category structure. In *Concepts and conceptual development: Ecological and intellectual factors in categorization*, ed. U. Neisser. Cambridge: Cambridge University Press.

1989. *Concepts, kinds and conceptual development*. Cambridge, Mass.: MIT Press.

Keller, J. D., and Lehman, C.

1991. Conceptual complexity and cosmological ideas, *Cognitive Psychology* 23:65-95.

1993. Computational complexity in the modelling of cosmological ideas. In *Cognitive aspects of religious symbolism*, ed. P. Boyer.Cambridge: Cambridge University Press.

Kelly, M., and Keil, F. C.

1985 The more things change.., metamorphoses and conceptual structure, *Cognitive Science* 9:403-416.

Lakoff, G.

1987. *Women, fire and dangerous things: What categories reveal about the mind*. Chicago: University of Chicago Press.

Lakoff, G., and Johnson, M.

1980. *Metaphors we live by*. Chicago: University of Chicago Press.

Laurendau, M., and Pinard, A.

1962. *Causal thinking in the child*. New York: International Universities Press.

Lawson, E. T., and McCauley, R.

1990. *Rethinking religion: Connecting culture and cognition*. Cambridge: Cambridge University Press.

Leach, E. R.

1976. *Culture and communication: The logic by which symbols are connected*. Cambridge: Cambridge University Press.

Lee, D. D.

1949. Being and value in a primitive culture, *Journal of Philosophy* 8 (13): 401-415.

Leslie, A.

1979. *The representation of perceived causal connection*. D. Phil. thesis, University of Oxford, Oxford.

1982. The perception of causality in infants, *Perception* 11:173-186.

1987. Pretense and representation: The origins of a "theory of mind," *Psychological Review* 94:412-426.

1988. The necessity of illusion: Perception and thought in infancy. In *Thought without language*, ed. L. Weizkrantz. Oxford: Clarendon Press.

Leslie, A., and Frith, U.

1987. Meta-representation and autism: How not to lose one's marbles, *Cognition* 27:291-294.

Leslie, A., and Keeble, S.

1987. Do six-months old infants perceive causality? *Cognition* 25:265-288.

Lewis, D.

1975. Causation. In *Causation and conditionals*, ed. E. Sosa. London: Oxford University Press.

Lloyd, G. E. R.

1991. *Methods and problems in Greek science*. Cambridge: Cambridge University Press.

Lucariello, J., and Nelson, K.

1985. Slot-filler categories as memory organizers for young children, *Developmental Psychology* 21:272-282.

Lucariello, J., and Rifkin, A.

1985. Event-representations as the basis for categorical knowledge. In *Event knowledge: Structure and function in development*, ed. K. Nelson. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Lukes, S.

1982. Relativism in its place. In *Rationality and relativism*, ed. M. Hollis and S. Lukes. Oxford: Basil Blackwell Publisher.

Lumsden, C. J., and Wilson, E. O.

1980. Gene-culture translation in the avoidance of sibling incest, *Proceedings of the National Academy of Sciences* 77:6248-6250.

1981. *Genes, minds and culture*. Cambridge, Mass.: Harvard University Press.

1982. Precis of *Genes, minds and culture*, *Behavioral and Brain Sciences* 5:1-37.

McCloskey, M.

1983. Naive theories of motion. In *Mental models*, ed. D. Gentner and A. L. Stevens. Hillsdale, N.J.: Lawrence Erlbaum Associates.

McCloskey, M., and Gluckberg, S.

1979. Decision processes in verifying category membership statements: Implications for models of semantic memory, *Cognitive Psychology* 11:1-37.

MacCormac, E. R.

1985. *A cognitive theory of metaphor*. Cambridge, Mass.: MIT Press.

Mackie, J. L.

1974. *The cement of the universe*. Oxford: Clarendon Press.

Mallart-Guimera, L.

1975. Ni dos ni ventre: Magic, sorcellerie et religion evuzok, *L'Homme: Revue Française d'Anthropologie* 15:35-65.

1981. *Ni dos ni ventre*. Paris: Société d'Ethnographie.

Mandler, J. M.

1979. Categorical and schematic organization in memory. In *Memory organization and structure*, ed. C. IL Puff. New York: Academic Press.

Markman, E. M., and Wachtel, G.

1988. Children's use of mutual exclusivity to constrain the meaning of words, *Cognitive Psychology* 20:121-157.

Massey, C., and Gelman, R

1988. Preschoolers' ability to decide whether pictured unfamiliar objects can move themselves, *Developmental Psychology* 24:307-317.

Medin, D. L., and Ortony, A.

1989. Psychological essentialism. In *Similarity and analogical reasoning*, ed. S. Vosniadou and A. Ortony. Cambridge: Cambridge University Press.

Medin, D. L., and Wattenmaker, W. D.

1987. Category cohesiveness, theories and cognitive archaeology. In *Concepts and conceptual development: Ecological and intellectual factors in categorization*, ed. U. Neisser. Cambridge: Cambridge University Press.

Michalski, R

1989. Two-tiered conceptual meaning, inferential matching and conceptual cohesiveness. In *Similarity and analogical reasoning*, ed. S. Vosniadou and A. Ortony. Cambridge: Cambridge University Press.

Michotte, A. E.

1963. *The perception of causality*. New York: Basic Books.

Miller, R

1987. *Fact and method: Explanation, confirmation and reality in the natural and the social sciences*. Princeton, N.J.: Princeton University Press.

Murphy, G. L., and Medin, D. L.

1985. The role of theories in conceptual coherence, *Psychological Review* 92:289-316.

Nakamura, G. V.; Graesser, A. C.; Zimmerman, J. A. and Riha, J.

1985. Script processing in a natural situation, *Memory and Cognition* 13:140-144.

Needham, R

1976. Skulls and causality, *Man*, N. S. 11:71-88.

1985. *Exemplars*. Berkeley, Los Angeles, London: University of California Press.

Neisser, U.

1987. *Concepts and conceptual development: Ecological and intellectual factors in categorization*. Cambridge: Cambridge University Press.

Nelson, K., and Gruendel, J.

1986. Children's scripts. In *Event knowledge: structure and function in development*, ed. K. Nelson, Hillsdale, N.J.: Lawrence Erlbaum Associates.

Newton-Smith, W.

1982. Relativism and the possibility of interpretation. In *Rationality and relativism*, ed. M. Hollis and S. Lukes. Oxford: Basil Blackwell Publisher.

Ortony, A., ed.

1979. *Metaphor and thought*. Cambridge: Cambridge University Press.

Osherson, D. N., and Smith, E. E.

1981. On the adequacy of prototype theory as a theory of concepts, *Cognition* 9:35-58.

Penner, H.

1985. Language, ritual and meaning, *Numen* 22:1-16.

Perner, J.

1991. *Understanding the representational mind*. Cambridge, Mass.: MIT Press.

Piaget, J.

1930. *The child's conception of physical causality*. London: Routledge and Kegan Paul.

1954. *The child's construction of reality*. New York: Basic Books.

1974. *Understanding causality*. New York: W. W. Norton and Co.

Piatelli-Palmarini, M., ed.

1980 *Language and learning*. Cambridge, Mass.: Harvard University Press.

Premack, D.

1990. The infant's theory of self-propelled objects, *Cognition* 36:1-16.

Putnam, H.

1975. *Mind, language and reality: Philosophical papers (II).*> Cambridge: Cambridge University Press.

1983. *Realism and reason: Philosopical papers (III).* Cambridge: Cambridge University Press.

Quine, W. V. O.

1969. Natural kinds. In *Ontological relativity and other essays*. New York: Columbia University Press.

Ramsey, F. P.

1931. *The foundations of mathematics*. London: Kegan Paul.

Rappaport, R. A.

1974. The obvious aspects of ritual, *Cambridge Anthropology* 2:3-69.

1979. *Ecology, meaning and religion*. Berkeley, Calif.: North Atlantic Books.

Richards, D. D., and Siegler, R. S.

1986. Children's understanding of the attributes of life, *Journal of Experimental Child Psychology* 42:1-22.

Richards, I. A.

1936. Metaphor. In The philosophy of rhetoric, ed. I. A. Richards. London: Oxford University Press.

Richerson, P. J., and Boyd, R.

1978. A dual inheritance model of the human evolutionary process: I. Basic postulates and a simple model, *Journal of Social and Biological Structures* 1:127-153.

1984. Natural selection and culture, *Bioscience* 34:430-434.

Rips, L. J.

1989. Similarity, typicality and categorization. In *Similarity and analogical reasoning*, ed. S. Vosniadou and A. Ortony. Cambridge: Cambridge University Press.

Rosch, E.

1977. Human categorization. In *Studies in cross-cultural psychology (I)*, ed. N. Warren. London: Academic Press.

Rosch, E., and Lloyd, B. B., eds.

1978. *Cognition and categorization*. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Roth, E. M., and Shoben, E. J.

1983. The effects of context on the structure of categories, *Cognitive Psychology* 7:573-605.

Sahlins, M.

1976. *The use and abuse of biology: An anthropological critique of socio-biology*. Ann Arbor: University of Michigan Press.

Sapir, J. D. and Crocker, J. C., eds.

1977. *The social use of metaphor*. Philadelphia: University of Pennsylvania Press.

Schank, R. C., and Abelson, R.

1977. *Scripts, plans, goals and understanding: An inquiry into human knowledge structures*. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Schank, R. C.; Collins, G. C.; and Hunter, L. E.

1986. Transcending inductive category formation in learning, *Behavioural and Brain Sciences* 9:639-686.

Schustack, M. W., and Sternberg, R. J.

1981. Evaluation of evidence in causal inference, *Journal of Experimental Psychology: General* 110:101-120.

Semaj, L. T.

1980. The development of racial evaluation and preference: A cognitive approach, *Journal of Black Psychology* 6:59-79.

Shank, R., and Abelson, R.

1977. *Scripts, plans, goals and understanding*. New Haven, Conn.: Yale University Press.

Sherzer, J., and Woodbury, J., eds.

1987. *Native American discourse*. Cambridge: Cambridge University Press.

Shoben, E. J.

1984. Semantic and episodic memory. In *Handbook of social cognition (II),* ed. R. S. Wryer and T. K. Srull Hillsdale, N.J.: Lawrence Erlbaum Associates.

Shoemaker, S.

1980. Properties, causation and projectibility. In *Applications of inductive logic*, ed. L. J. Cohen and M. Hesse. Oxford: Clarendon Press.

Skorupski, J.

1976. *Symbol and theory: A philosophical study of theories of religion in social anthropology*. Cambridge: Cambridge University Press.

Skyrms, B.

1984. EPR: Lessons for metaphysics. In *Causation and causal theories [Midwest studies in philosophy IX],* ed. T. French, F. Vehling, and K. Wettstein. Minneapolis: University of Minnesota Press.

Smith, E. E., and Medin, D. L.

1981. *Categories and concepts*. Cambridge, Mass.: Harvard University Press.

Smithson, M.

1989. *Ignorance and uncertainty: Emerging paradigms*. New York: Springer Verlag.

Sosa, E., ed.

1975. *Causation and conditionals*. London: Oxford University Press.

Sommers, F.

1959. The ordinary language tree, *Mind* 68:160-185.

Spelke, E. S.

1988. The origins of physical knowledge. In *Thought without language*, ed. L. Weizkrantz. Oxford: Oxford University Press.

1990. Principles of object perception, *Cognitive Science* 14:29-56.

Sperber, D.

1975. *Rethinking symbolism*. Cambridge: Cambridge University Press.

1980. Is symbolic thought pre-rational? In *Symbol as sense*, ed. FLeCron, F. Foster, and S. Brandes. New York: Academic Press.

1982. Apparently irrational beliefs. In *Rationality and relativism*, ed. M. Hollis and S. Lukes. Oxford: Basil Blackwell Publisher.

1985a. Anthropology and psychology: Towards an epidemiology of representations, *Man* 20:73-89.

1985b. *On anthropological knowledge*. Cambridge: Cambridge University Press.

1991. The epidemiology of beliefs. In *Psychological studies of widespread beliefs*, ed. C. Fraser. Oxford: Oxford University Press.

Spiro, M.

1966. Problems of definition and explanation. In *Anthropological approaches to the study of religion*, ed. M. Banton. London: Tavistock (A.S.A. Monographs, 3).

Staal, F.

1979. The meaninglessness of ritual, *Numen* 26:2-22.

Stich, S.

1983. *From folk psychology to cognitive science: The case against belief*. Cambridge, Mass.: MIT Press.

Suppes, P.

1970. *A probabilistic theory of causation*. Amsterdam: North-Holland.

Tambiah, S. J.

1970. *Buddhism and the spirit-cults in North-East Thailand*. Cambridge: Cambridge University Press.

1981. A performative approach to ritual, *Proceedings of the British Academy* 65:113-169.

1984. *The Buddhist saints of the forest and the cult of amulets*. Cambridge: Cambridge University Press.

Tooby, J., and Cosmides, L.

1989. Evolutionary psychology and the generation of culture (part I), *Ethnology and Sociobiology* 10:2949.

Turiel, E.

1983. *The development of social knowledge: Morality and convention*. Cambridge: Cambridge University Press.

Turner, V.

1967. *The forest of symbols: Aspects of Ndembu ritual*. Ithaca, N.Y.: Cornell University Press.

1968. *The drums of affliction*. Oxford: Clarendon Press.

Tversky, A., and Kahnemann, D.

1974. Judgment under uncertainty: Heuristics and biases, *Science* 185:1124-1131.

Tylor, E. B.

1871. *Primitive culture*, Vol. I. London: John Murray.

Vendler, Z.

1967. Causal relations, *Journal of Philosophy* 64:704-713.

Walker [Jeyifous], S.

1986. *Atimodemo: Semantic conceptual development among the Yoruba*. Ph.D. thesis, Cornell University, Ithaca, N.Y.

1992. Developmental changes in the representation of word-meaning: Cross-cultural findings, *British Journal of Developmental Psychology*, 10:285-299.

Weber, M.

1968. *Economy and society: An outline of interpretive sociology* (ed. G. Roth and D. Martindale). New York: Free Press.

Wellmann, H. M.

1990. *The child's theory of mind*. Cambridge, Mass.: MIT Press.

Wellmann, H., and Estes, D.

1986. Early understanding of mental entities: A re-examination of childhood realism, *Child Development* 57:910-923.

Whiten, A., ed.

1991. *Natural theories of mind: The evolution, development and simulation of everyday mindreading*. Oxford: Basil Blackwell Publisher.

Wilson, B., ed.

1970. *Rationality*. Oxford: Basil Blackwell Publisher.

Wilson, E. O.

1975. *Sociobiology: The new synthesis*. Cambridge, Mass.: Harvard University Press.

Winston, P. H.

1975. Learning structural descriptions from examples. In *The Psychology of computer vision*, ed. P.H. Winston. New York: McGraw-Hill Book Co.

INDEX

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