

## 7 Conceptual Tools for a Naturalistic Approach to Cultural Evolution

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While most anthropologists are not naturalistic in their approach and are not even trying to be, the project of a natural science of society and culture has always haunted the field. Radcliffe-Brown for instance wrote: “I conceive of social anthropology as the theoretical natural science of human society, that is, the investigation of social phenomena by methods essentially similar to those used in the physical and biological sciences” (1952: 189). It is not enough, of course, to want one’s science to be naturalistic for it to be so. Radcliffe-Brown’s anthropology remained well within the traditional social sciences of its time, quite removed from the natural sciences. Part of the reason is that what makes a science natural is not just its methods but also its ontology, i.e., the kinds of phenomena it recognizes as being part of the world and tries to account for. For instance, modern economics uses mathematical methods that are clearly scientific, but the objects it recognizes—markets, money, rational agents, etc—do not in any clear way belong to the furniture of the natural world. Their causal powers are not related in any clear or even hazy way to their material property and therefore economics is not (and is not intended as) a natural science.

Recently, several eminent biologists have approached cultural phenomena from an evolutionary perspective (Cavalli-Sforza and Feldman 1981; Dawkins 1976; Lumsden and Wilson 1981). Their contributions have stirred intense interest and discussion. Their goal and their methods have, of course, been naturalistic—much more clearly so than Radcliffe-Brown’s—but their ontology is largely borrowed from the existing social sciences and is not clearly naturalistic. Religion, ritual, law, kinship, marriage, taboo, prestige, power, and so on, are the kind of things students of culture try to explain, whether they come from the traditional social sciences or from the biological sciences. There is no available naturalistic characterization of these things, nor is there any obvious way to provide one.

What do you have to do, then, to become really naturalistic? The presupposition of a naturalistic approach is that whatever has causal powers has them by virtue of its material properties. The first rule to follow is: Don’t recognize phenomena unless your grasp of their material mode of existence justifies your attributing them with causal

powers. The second rule is: Don't make a causal claim unless you can back it with the description of a mechanism, a description fine-grained enough for it to be reasonable to ask neighboring natural sciences to fill in the missing parts. These rules are well respected in fields such as biology, ecology, or geomorphology. In the study of culture, they are not understood, let alone respected, not even by people whose background and goals are unquestionably naturalistic.

To develop a naturalistic approach to culture, we must reconceptualize the field. To do so, we may draw inspiration from a science that is at once social and natural: medical epidemiology. In epidemiology, social macrophenomena such as endemic and epidemic diseases are analyzed in terms of patterns of microphenomena of individual pathology and interindividual transmission. In other writings, I have developed the project of a cultural epidemiology, and I have compared it with other approaches (Sperber 1996, 2001a). Here, I would like to characterize some of the most basic conceptual tools needed to develop a naturalistic ontology of cultural things in this epidemiological perspective. To help suggest how this conceptual rethinking may also be relevant to traditional anthropological pursuits, I will use an ethnographic example derived from my fieldwork among the Dorzé of South Ethiopia.

Among the many ways of explaining and coping with misfortune, two types deserve special attention, both for their worldwide recurrence and for their sociocultural import: mystical aggression or witchcraft, and mystical sanctions resulting from the transgression of taboos. In both types, misfortune is seen as initially caused by a human agent. In the case of mystical aggression, the culprit and the victim are distinct and indeed hostile individuals (or groups). In the case of transgression, the culprit and the victim are one and the same individual (or group). Many societies, while acknowledging both mystical aggression and transgression as possible explanations of misfortune, greatly favor one type of explanation over the other. This difference in the ascription of responsibility is rich in moral and social implications. For instance, in a witchcraft-oriented society, personal enrichment is likely to be viewed as evidence of guilt and therefore to be discouraged, whereas in a taboo-oriented society, it is likely to be viewed as a evidence of moral worth and to be encouraged.

The Zandé are a paradigmatic case of a society in which mystical aggression is the preferred explanation of misfortune (Evans-Pritchard 1937). The Dorzé were, when I visited them some 30 years ago, extreme in their preference for explanations in terms of transgression. When a misfortune occurred, most Dorzé would ask as a matter of course: "From which *gomé* did the misfortune come?" The term *gomé* denotes both the act of transgression and the resulting mystical sanction.

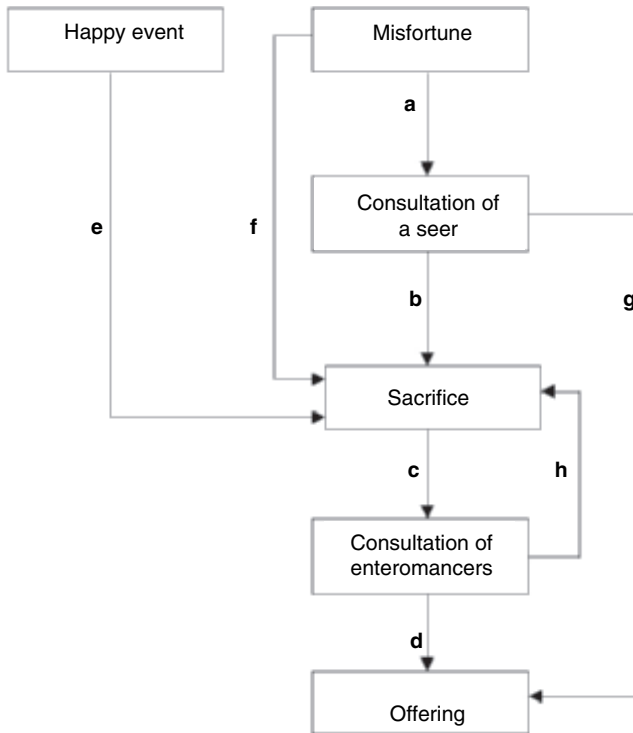
Dorzé adults could list hundreds of rules, the transgression of which would be *gomé*. Here are a few examples: It is *gomé* to let a drop of human blood fall in the food, to cook over a fire where a lizard has died, to ride a dog, to kill a snake, to have intercourse with a tanner or a potter (except, of course, for tanners and potters), to sacri-

fice an animal when one's father is alive, or to commit perjury. The rules are so many that everyone is likely to have been wittingly or unwittingly guilty of several transgressions. This does not seem to worry people. The problem of establishing that a particular transgression took place arises only when diviners are consulted, either because of a misfortune or in order to ascertain whether a sacrifice has been successful.

Only diviners are expected to know all the different types of *gomé* and all the ritual practices that must be followed to expiate a transgression. These diviners are of two main types: There are enteromancers who can "read," from the entrails of a sacrificed sheep or goat, which transgressions have been committed by the sacrificer or his dependents. This is a form of knowledge acquired with experience and typically is held by senior men who were themselves sacrificers. After having performed a sacrifice, a man typically will show the entrails to one or several senior neighbors who are competent in enteromancy. The second category of diviners consists of seers who use a variety of techniques, the most common one being geomancy. More important than the techniques they use is the seers' special divinatory gift, often linked to possession by a spirit. Seers can be men or women, central or marginal members of the community. People will often visit a seer who is some distance from their home. Unlike consultations of enteromancers, consultations of seers tend to be private and discreet affairs.

The ensemble of representations and practices involving the notion of *gomé* could be described by some traditional anthropologists as a cultural system and a major component of the Dorzé worldview. It could be described by others as a system of norms that shapes social relations and helps maintain social cohesion and power structures. Both types of macrolevel description would be insightful, and I do not particularly want to argue against them. It should be obvious, however, that neither the cultural nor the functional-structural approach is naturalistic. Do the ethnographic data also lend themselves to a more naturalistic approach, and could they provide relevant evidence in a naturalistic science of society and culture? To try and answer this, we must look—or here just peek—at the data at a lower, much more concrete level.

Ideas involving *gomé* and related practices are deployed in interindividual interactions, and in particular in consultations of diviners and in ritual practices. In spite of their variety, these interactions tend to follow a general pattern that can be represented in diagrammatic form (figure 7.1). The various possible sequences in this diagram can be illustrated with three chains of events that took place in Albazo's household over a period of 5 months (names have been changed; for a more detailed discussion, see Sperber 1980). His was one of a sample of forty households, the ritual activities of which were followed for 7 months in 1970–1971 (in collaboration with Judith Olmstead, who was surveying these households in a more systematic manner, and with her assistant Abesha Alemu; see Olmstead 1974, 1975). Albazo was at the time a 35-year-old weaver. He had spent several years working in Addis Ababa and had



**Figure 7.1**

Possible chains of events in Dorzé divinatory and sacrificial practices. The most typical chain of events begins with a misfortune that causes the victim or the household head to consult a seer (a). The seer diagnoses a *gomé* and prescribes a sacrifice (b). The entrails of the sacrificed animal are shown to enteromancers (c), who prescribe an offering of beer or honey to put an end to the case (d). In other chains of events, the initial sacrifice may be caused by a happy event (e) or directly by a serious misfortune (f). For a minor *gomé*, a seer may directly prescribe an offering (g). When the entrails are “bad,” enteromancers may prescribe a second sacrifice (h).

come back a year before at the death of his father. Present in his compound were his mother Bodé, his wife Maté, and a young sister’s daughter who helped with domestic chores. Albazo’s younger brother Abaté had remained in Addis Ababa to work. Albazo and Maté were without children; an infant son had died a few years earlier. Albazo was well off and could have felt quite contented if it had not been for his being childless, and also for his mother not quite acknowledging that he was now the head of the household and persisting in treating him like a child.

**Chain of events 1** In September 1970, at the time of the Ethiopian Maskal festival, Albazo sacrificed a lamb, saying: “Oh Maskal, you who have led me happily until now,

be thanked!" He showed the entrails to three enteromancers of the neighborhood. They said: "There is a *gomé* of mother's insults." Albazo recognized that his mother Bodé had indeed insulted him because he had bought clothes for his wife Maté and not for her. The enteromancers instructed Albazo to make amends to his mother and to end the *gomé* with a libation, and so he did. This is a case of a sacrifice caused by the happy event of Maskal resulting in a consultation of diviners, the identification of a minor *gomé*, and an offering to end it (figure 7.1, path e-c-d).

Chain of events 2 In October 1970, Albazo's wife, Maté, whose eyes had been hurting her for several days, went to consult a seer. The seer, a geomancer, looked at the pebbles and said: "There is a *gomé* of honey." Maté remembered having eaten some of the honey her husband kept for offerings. Instructed by the diviner, she confessed her fault to her husband, who made an offering of honey. This is a case of misfortune resulting in the consultation of a seer and an offering. Neither sacrifice nor enteromancy is involved (figure 7.1, path a-g).

Chain of events 3 In January 1971, Albazo sacrificed a kid to his *k'ada ts'ala'e*, his "good luck demon," in order to find out why, unlike his friends, he was still childless. He showed the entrails to three enteromancers of his neighborhood. They said: "It is the *gomé* of the mother who gave you birth. She does not want you to have a child, and out of rancour, she cursed you. She should ask for forgiveness and give you a sheep [to sacrifice]." Bodé indeed confessed to being filled with bad feelings toward her son, and gave him a lamb. Albazo sacrificed the lamb and showed the entrails to the same three enteromancers. This time they said: "There is a *gomé* of you and your wife. Your *gomé* is to have said: "Don't let me have a child from her!" and her *gomé* is to have said: "Don't let me have a child from him!" Gather old men, have them forgive you both and make an offering of beer!" And so it was done. This is a case of a misfortune so serious that a sacrifice was performed in order to consult enteromancers, resulting in a second sacrifice and then an offering (figure 7.1, path f-c-h-c-d).

Before leaving aside, for the time being, the story of Albazo, let me explain what may have been its main import for the people involved. Albazo, his mother, and his wife were going through a transitory phase after the recent death of his father. Albazo's new position as household head, his descent, his age, his wealth, should all have concurred in progressively making him a well-established senior member of his community. However, he had no children and too much of a mother. The part played by the diviners must be understood against this background. They took advantage of a Maskal sacrifice, an eye complaint of Maté, and a sacrifice directly aimed at divination to ease the tension and redefine the roles in Albazo's household. Let the son be kinder to his mother, but let her acknowledge his authority; let the wife pay attention to her husband's new prerogatives; let the household head perform his new duties with

serenity. Through divinatory procedures, the ineffectual anxieties caused by misfortunes are refocused on manageable psychological and social issues.

All this is, of course, anthropological data of a very familiar kind. In most cases, however (with notable exceptions such as Fredrik Barth 1975), such microlevel data are used to illustrate an explanation given in terms of macrolevel notions. What I want to suggest is that this microlevel is the proper level for naturalistic explanation. Now back to concepts.

### Cognitive Causal Chains

Half a century ago, at the time when Radcliffe-Brown was calling for “a natural science of society,” naturalistic explanations were not a genuine option in anthropology, nor more generally in the social sciences. The main reason for this has to do with the role that representations play in identifying the objects of the social sciences. It is indeed quite impossible to identify most, if not all, social-cultural phenomena without crucially relying on the mental representations of social agents. There is no theoretical perspective from which the *gomé* system, for instance, could be described without attending to general ideas the Dorzé have about *gomé* and the ideas individuals have about the specific cases in which they are involved in one capacity or another.

Until recently, there was no hint of a way to naturalize representations. More specifically, representations have material and abstract properties. Materially, public representations such as utterances or symbolic gestures may consist of marks on paper, or bodily movements, or any other kind of object in the environment that humans can produce and perceive. The material character of public representations is relatively unproblematic and poses no serious challenge to a naturalistic approach. Mental representations such as memories or desires consist of neural patterns in the brain. With recent developments in neurology, the material character of mental representations is beginning to be investigated in scientific terms. The most serious difficulty facing any attempt to naturalize representations has to do with their abstract properties. Representations, whether mental or public, have content, which is an abstract property. Moreover, it is by their content rather than their material properties that we tend to identify representations. For instance, we can talk of the tale of Goldilocks and the three bears without referring to its various material realizations, in speech, in writing, or in brain activation patterns. On the other hand, we would hardly ever find it of interest to talk of these public or mental material realizations without identifying them first as bearers of the content of Goldilocks and the three bears.

How can the abstract property of content be realized or implemented in the material world? How can the fact that abstract properties carry no causal power be reconciled with the fact that the content of a representation can be highly relevant in explaining its causal relationships? One thing that has greatly helped in answering

these questions has been understanding how a computer program, which also has abstract content properties, can be materially realized and play a causal role in the world. With the recent development of the cognitive sciences—which is sometimes called the cognitive revolution—the goal of naturalizing representations is for the first time being approached in a realistic manner. We begin to understand how material processes systematically implement content relationships and have effects that are illuminated by these relationships. Let me sketch a brief and trivial illustration:

On October 31, at 7:30 p.m., Mrs. Jones's doorbell rings. Mrs. Jones hears the doorbell and assumes that there is somebody at the door. She remembers it is Halloween. She enjoyed receiving treats as a child and now as an adult she enjoys giving them. She guesses that there must be children at the door ready to trick-or-treat, and that if she opens it, she will be able to give them the candies she has bought for the occasion. Mrs. Jones decides to open the door and does so.

We have here an environmental change (the ringing of the doorbell), a process of perception (Mrs. Jones hearing and recognizing the doorbell), a process of epistemic inference (her inferring that there is somebody at the door), the retrieval from memory of a belief (that it is Halloween) and a desire (to give candies to children), a second process of epistemic inference (inferring that there must be children at the door ready to trick-or-treat), a process of practical inference (inferring that in order to fulfill her desire to give candies, Mrs. Jones should open the door) and the realization of an intention (to open the door), resulting in an environmental change (the opening of the door).

These events are causally related in a complex chain. This is a special kind of causal chain that I will call a cognitive causal chain, or CCC for short. What makes it cognitive is, roughly, the fact that to each of the causal links in the chain, there corresponds a semantic or content relationship. Mrs. Jones's perception of the doorbell ringing both represents the doorbell ringing and is in part caused by it. Mrs. Jones's remembering that it is Halloween and what is likely to happen now is similar in content (with appropriate updating) to the knowledge derived from previous experiences of Halloween, and that stored knowledge is among the causes of her remembering. Mrs. Jones's coming to specific conclusions (whether epistemic—*someone is at the door, children are at the door ready to trick-or-treat*—or practical—*let me open the door*) is both justified by specific premises and caused in part by her entertaining these premises. Mrs. Jones's opening of the door both satisfies her intention to do so and is caused in part<sup>1</sup> by this intention.

Semantic relationships such as truth, satisfaction, justification, or similarity of content are abstract relationships and not causal ones. Perception, inference, remembering, and the carrying out of an intention are causal processes. These processes, however, are characterized in terms of the abstract semantic relationships they tend to instantiate. When we describe mental processes as processes of perception,

inference, remembering, or intending, we mean that these processes tend to produce outputs that are in a characteristic semantic relationship to their inputs. A successful perception yields a representation that represents the very stimulus that caused the perception. A successful process of inference yields a conclusion justified by its input premises. A successful remembering yields a memory similar to the initially stored information. The successful carrying out of an intention brings about the state of affairs represented in the intention.

Mental life is made up of CCCs where the links are both semantic and causal, and not fortuitously so, but because each of the causal processes involved has the function of instantiating a certain type of semantic relationships.<sup>2</sup> Materialists of the past could well postulate that the causal aspects of cognition should in principle be wholly describable in material terms, but it is only recently that we have become capable of actually describing material mechanisms that instantiate abstract semantic relationships. When describing CCCs, not only can we claim, on general grounds, that they occur in the brain and in the interactions between the brain and its environment, we can also begin to describe in computational and neurological terms the kinds of material processes that realize these CCCs.

Assuming that the cognitive sciences do provide us with a naturalistic notion of mental representations (or at least with a notion that is in the process of being naturalized), how does this help us naturalize the notion—or notions—of representations used in the social sciences? Psychologists talk about individual mental representations. Social scientists talk about representations that are in some sense collective (whether they use the term *representation* or just talk of ideologies, beliefs, values, and so on, which are all kinds of representations). It could be argued then that “representation” in psychology and “representation” in the social sciences merely share the most basic property of representations in general, i.e., “aboutness,” being about something, having some “content,” but that otherwise they are quite different things.

### **Social Cognitive Causal Chains**

The story of Mrs. Jones, as told so far, is typical of individual psychology. It is all about inputs to an individual organism, its internal processes, its individual representations, and the behavioral outputs of this organism. In this particular case, however, the causal chain directly involved other individuals, to begin with, Billy and his little sister Julia:

Billy and Julia are following the Halloween practice of going from door to door in the street, hoping to be given candies. When they reach Mrs. Jones’s door, Billy rings the bell with the intention of letting the house owner know that someone is at the door, and of making her open the door . . . [insert Mrs. Jones’s story as told earlier]. Mrs. Jones opens the door. Billy and Julia shout “trick or treats!” Mrs. Jones gives them candies.



Ringling a doorbell is a process of communication. Like all processes of communication, it has the function of causing, in the mind of the addressee, the formation of a representation similar in content to the representation the communicator had in mind (in this case, the content is that the addressee should open the door to the ringer of the bell). Notice that in such an interindividual causal chain, the interindividual links are no less cognitive (i.e., instantiating semantic relationships) than the intraindividual ones. Communication instantiates semantic relationships of similarity of content, not within an individual, but across individuals. When a CCC extends over several individuals, I call it a social CCC. Social CCCs may involve just two individuals, or a few, or extend indefinitely over social time and space. Thus the interaction between Mrs. Jones and the children on the night of Halloween is just a fragment of a much longer and wider social CCC that links all particular Halloween events to the emergence of the practice and to one another.

Communication provides paradigmatic examples of social CCCs. In the case of an assertive act of communication, the social CCC typically goes from a mental event in the communicator, to an environmental event (e.g., the production of a signal such as a doorbell ring, or of a linguistic utterance), to a mental event in the addressee, and stops there. In the case of a request, the social CCC typically extends one step further, to a second environmental event that fulfills the request. Thus Mrs. Jones, having understood that someone wants the door opened, opens the door. Both Billy and Mrs. Jones form the intention that the door be opened. However, while Mrs. Jones is in a position to carry out this intention by herself, and does so, Billy, for the same purpose, needs to recruit Mrs. Jones and does so by communicating a request. Mrs. Jones's fulfillment of Billy's request instantiates a semantic relationship between one individual's mental state and another individual's action. More generally, the fulfillment of a desire by means of a request to another individual is a major kind of social CCC. This is true of the very simple communication established by ringing a doorbell as well as the more elaborate back-and-forth communication involved in ongoing collective action.

While communication provides the most obvious cases, noncommunicative forms of interaction may also determine social CCCs. These include imitation and other forms of emulation. Consider a group of people walking for the first time from a new settlement to some landmark in the distance. One person walks in front, choosing the best path through the bush—a cognitive process—and treading over grass and ground. The others follow in line, each contributing to marking the path. The following days, months, and years, when people follow this footpath they will each contribute to maintaining it as a stable and salient feature of the landscape, causing others, or themselves on later occasions, to borrow it in turn. The path started its existence as the visible effect of a series of microdecisions (of stepping here rather than there) of one

individual. This visible effect caused other individuals to make similar microdecisions, adding to the initial effect.

Now the path has become the collective production of all those who have followed it, an item of the socially shared landscape, and a spatially extended perceptual input guiding the steps of every new walker. There is, then, a social CCC going from the microdecisions of past walkers to those of future walkers, via the environmental changes that each contributes. At times, as when individuals walk in line, there may be a deliberate imitation of the behavior of one individual by others. A solitary walker, on the other hand, may choose to follow a path without paying attention to the fact that in doing so she or he is emulating other people. Whether conscious or unconscious, such spontaneous forms of emulation may determine a social CCC, and do this without resorting to communication proper.

### **Mental Representations and Public Productions (Including Public Representations)**

Social CCCs link mental and public things. The mental things involved are mental representations and processes, which may cause behaviors that alter the environment in ways that can be perceived and that can serve as stimuli to further cognitive processes. Some of these environmental changes are perceptible as processes, e.g., bodily movements, speech sounds; others are perceptible as stable states of the environment, e.g., the presence of paths, buildings, artifacts, or writings. I will call all such perceptible behaviors and effects of behavior public productions. Some public productions, for instance utterances, signals, or pictures, are produced for the purpose of being perceived and causing mental representations. These public representations form a particularly important subclass of public productions. Social CCCs, then, are characterized by an alternation, along the causal chain, of mental representations and public productions (including public representations).

The three chains of events in Albazo's story were each a case of a social CCC. The point of saying this is not to introduce new terminology for terminology's sake. It is to suggest a level at which the very different ingredients of such a causal chain—worries, misfortune, divination, confession, sacrifices, offerings, and so forth—can be seen as an alternation, along the causal chain, of public productions and mental representations that are linked by causal relations and by content relations. The mental representations involved were beliefs and desires both caused and justified by public events, and most of the public productions were, in this case, public representations such as utterances and symbolic gestures fulfilling mental intentions and caused by these intentions.

In the diagram I presented earlier (figure 7.1), outlining the various kinds of *gomé*-related chains of events, only public events were mentioned. However, public events cause further public events through the mediation of mental events, which must also

be taken into consideration. To illustrate this, let us go back to the second chain of events. Albazo's wife, Maté, suffering from eye pain, consults a seer. What are the psychological processes that link her eye pain to her going to consult a seer? Not all such pains result in such a course of action. Maté might have sought help in traditional medicine or she might have waited for the pain to go away. However, her husband's mother, Bodé, a few days earlier had scored a kind of domestic victory. After Albazo had sacrificed a thanksgiving lamb, the enteromancers had diagnosed a *gomé* caused by his having bought clothes for his wife but not for his mother. By going to the seer, Maté makes sure that her husband's next ritual action will be for her sake. In other words, Maté's capacity to anticipate some indirect effects of her action may well be playing a decisive role.

When the seer diagnoses a "*gomé* of honey," Maté could interpret this in various ways. She could for instance have wondered whether she had unwittingly spoilt honey or mead. Or she could reject the seer's diagnosis by saying that she did not see what he could be referring to. In this case, however, the words of the seer cause her to remember having eaten from her husband's ritual honey. By interpreting the seer's diagnosis as referring to such an event, Maté turns the fault to which she will have to confess into a reassertion of her husband's privileges as the new head of the household. After the consultation, Maté could have decided to ignore it altogether or perhaps to see another seer. Similarly, her husband Albazo could have dismissed the whole matter. Each of these microdecisions would have changed the chain of events. Thus such a chain of events cannot be explained just by saying that it conforms to a cultural pattern or norm. On the contrary, the cultural pattern is a recurrent one—is a pattern—because relatively idiosyncratic causal factors tend, in a variety of circumstances, to converge on similar courses of action.

More generally, at every juncture in every social CCC, the mental processes of the individuals involved may tilt the chain of events one way or another. These mental processes exhibit cross-individual regularities. Some of these regularities have to do with basic cognitive and emotional dispositions that are part of the biologically evolved psychological makeup of humans. Others are contingent on historical and local circumstances. The anthropologist's goal is not to explain individual cases, but recurring patterns. However, I have argued that explaining recurring patterns requires attending to the kinds of psychological factors that affect individual cases.

### **Cultural Cognitive Causal Chains**

Most social CCCs are short. They bring about only local and brief transfers of information, coordinations of behaviors, or movements of matter such as transfers of goods. They are episodes like the three chains of events in Albazo's household. Although they are causally related to one another, each has its own specific content. Some social CCCs, though, are long and lasting, involve a great many individuals over

**Table 7.1**

Types of causal chains

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*Cognitive causal chain (CCC)*

A causal chain in which each link instantiates a semantic relationship

*Social cognitive causal chain (Social CCC)*

A CCC that extends over several individuals

*Cultural cognitive causal chain (CCCC)*A social CCC that stabilizes mental representations and public productions in a population and its environment

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time, and exhibit no discontinuity of content. The Halloween interaction I evoked was a typical fragment of such an extended chain. These long and lasting social CCCs have the effect of stabilizing mental representations and public productions in a population and its environment. Mental representations and public productions (practices or artifacts) that are stabilized by such extended social CCCs correspond to what we call the cultural. I propose to call social CCCs that stabilize cultural representations and productions cultural cognitive causal chains, or CCCCCs for short (table 7.1).

Let me illustrate what I mean when I say that representations or practices are “stabilized.” Take the case of a folktale such as Goldilocks and the three bears, and take it at the time when it was only transmitted orally. Each time the tale was told it contributed to the audience’s knowledge of the tale and to their desire to hear it again and possibly to tell it in turn. If it had not done so to a sufficient degree, the tale would not have remained as a stable cultural representation, since it was stabilized only by the CCCCC that linked tellings of the tale (public productions, and more specifically, public representations) to individuals’ knowledge of the tale and motivation to tell it in turn (i.e., mental representations).

The existence of CCCCCs and their stabilizing effect are among the most obvious aspects of human social life, but they are not easily explained. Human memory, imitation, and communication are not true replicating mechanisms. Their outputs are rarely, if ever, identical to their inputs. Even when the alterations between, say, the story heard and the story understood, the story understood and the story remembered, the story remembered and the story told are small—and often they are large—the cumulative effect of these alterations in an extended social CCC is likely to be such that contents rapidly decay or are transformed beyond recognition. This is indeed what happens with most stories told. For instance,

Carol tells Bob how she made a fuss at the supermarket. Bob tells Ted how Carol made a fool of herself at the supermarket. Ted, a while later, mixes this story with another one he had heard about Carol at the library, embellishes it and tells it to Alice, who does not believe it anyhow, and ends up remembering only that Ted accused women of behaving absurdly in department stores.

Most social CCCs are like these interactions among Bob, Carol, Ted, and Alice; they don't extend very far and they stabilize very little if anything at all.

Only some mental representations such as folktales, and some public productions such as sacrificial rites, exhibit great resilience and do get stabilized by CCCs. That is, they remain recognizably similar to antecedent representations or productions in the chain. Recognizable similarity is a matter of degree. There is no real boundary, therefore, between unquestionably cultural representations such as Goldilocks on the one hand, and apparently idiosyncratic stories such as that told by Carol to Bob about her adventures at the supermarket. Even the latter is recognizably similar, in its gist, to stories often told. In telling it, Carol was relying not just on her memory of the event but also on her memory of similar stories she had heard. In retelling it, Bob, and then Ted, were altering it, not at random, but in the direction of the cultural cliché that Alice all too easily recognized. No social CCC is ever unconnected to cultural CCCs; rather, all short and local social CCCs are offshoots of one or several cultural CCCs, and these offshoots may contribute to the persistence of the CCCs themselves.

To further illustrate this point let us go back to Albazo's story. The three chains of events I described were clearly idiosyncratic versions of enduring patterns, offshoots of CCCs that criss-cross Dorzé social life. When Albazo decided to sacrifice a thanksgiving lamb for the festival of Maskal, for instance, this decision and his action were clearly linked, both causally and in content, to innumerable similar decisions and courses of action taken in the past by other Dorzé household heads (and in particular by Albazo's father). Again, in showing the entrails to enteromancers of the neighborhood, Albazo was reproducing countless past actions by Dorzé household heads. On the other hand, in apologizing to his mother for having bought clothes for his wife but not for her, Albazo was attending to the particulars of his situation; nevertheless, his behavior was recognizably similar to that of many others.

The diviners themselves, when "reading" the entrails, were producing a version of past diagnoses adjusted to the particulars of the situation. Their thought processes and their diagnosis were at the crossing point of two social CCCs: the short social CCCs triggered by Albazo's Maskal sacrifice and the long cultural CCC that stabilizes the particular type of *gomé* that they diagnosed.

One point should be underscored here that is highly relevant to the explanation of cultural resilience and change. The diviners were extremely unlikely to opt out, so to speak, of available CCCs, and to produce a truly novel diagnosis—a new type of transgression for instance—that could have been challenged by Albazo or by other ritual experts. Still, there was a wide range of types of diagnoses to choose from. Each particular type is maintained by a specific cultural chain. In choosing a particular diagnosis, the diviners are contributing to the persistence of one of these cultural chains. Each time a type of diagnosis is chosen, it gains in salience and in the

likelihood of being considered on future occasions. If a particular type of diagnosis becomes more and more popular with the enteromancers, its cultural importance will grow, and so will the likelihood that this subvariety of diagnosis will become distinguished, leading to a split of the underlying CCCC into several new CCCCs. On the other hand, if a type of diagnosis becomes reproduced less and less, its CCCC will lose momentum and may eventually come to an end.

The evolution of the *gomé* system is thus to a large extent determined by the mental processes and the interactions that on each particular occasion, tilt the diviners' diagnosis one way or another. Among the factors that contribute to the diviners' preferences, I would like to mention two: the reactions of the persons consulting them and the state of the entrails. The persons seeking help are more or less willing to accept different diagnoses. They may, like Albazo with the enteromancers or Maté with the seer, recognize without difficulty that they are guilty of a transgression of the type mentioned by the diviners. In elaborating on the diviners' diagnosis, they contribute to the way the diviners themselves understand and mentally exemplify their somewhat cryptic diagnoses, such as "*gomé* of mother's insult," or "*gomé* of honey." The persons receiving a diagnosis may also be sceptical, or even disbelieve it. Diviners who produce unconvincing diagnoses may readjust their interpretations, or else they are likely to be less consulted in the future, and therefore play a less important role in cultural transmission.

Diviners practicing enteromancy are also constrained, in their diagnosis, by the state of the entrails they are asked to read. After all, there are rules of interpretation, and different shapes, spots, and anomalies of the entrails have more or less standard interpretations. Different oddities of entrails have different frequencies, over which the sacrificers and the enteromancers have no control. However, rules of interpretation are themselves cultural representations maintained by their own CCCCs. It is likely that without their awareness, the interpretive preferences of the enteromancers determine the evolution of the rules of interpretation. If, say, at a certain historical time, the swelling of a certain gland in the entrails is taken to indicate a type of *gomé* that diviners are less and less inclined to diagnose, and if this swelling is relatively frequent, it is likely that through a series of microdecisions, the interpretation of this swelling will be altered. The frequent swelling will progressively be interpreted as indicating a favored type of *gomé*.

I introduced the Dorzé example by contrasting those societies that generally explain misfortune in terms of witchcraft, and those that, like the Dorzé at the time of my visit, almost exclusively resort to explanations in terms of transgression and sanction. The relative place given to these two types of explanations results from a series of microdecisions and behaviors along cultural causal chains. The Dorzé did recognize various forms of mystical aggression—*bitha* or "sorcery" in particular—as possible sources of misfortune. It is just that these were rarely invoked. They were never

diagnosed by enteromancers and only rarely by seers. After the 1974 Ethiopian revolution when the Emperor Haile Selassie was deposed and replaced by a Marxist leadership, the senior members of Dorzé communities—including most of the enteromancers—were often denounced as bourgeois. Many rules, the transgression of which was considered *gomé*, were denounced as reactionary. In particular this was the case of rules having to do with seniority and ritual prerogatives. These are types of transgression typically “read” from the entrails, where patterns of blood vessels are interpreted as a genealogical tree indicating relationships of seniority and their possible disruptions. Such changes in turn rendered enteromancy less attractive than other forms of divination; they made people less willing to accept diagnoses involving issues of seniority. They encouraged seers to prefer making diagnoses in terms of other kinds of *gomé* (having to do, for instance, with food, sex, or possession by a spirit), and to increase the frequency of diagnosis in terms of *bitha*, sorcery. Although the new ideology was equally against ideas of *gomé* and *bitha*, both of which were denounced as superstitions, its propagation had in fact the effect of favoring explanations of misfortune in terms of mystical aggression rather than in terms of the transgression of taboos.

More generally, the existence of all degrees of balance across human societies between explanation of misfortune in terms of witchcraft or in terms of taboo is the cumulative effect of microprocesses, both mind-internal and mind-external, along the causal chains of culture. While a task for ethnography is to describe the factors that locally stabilize or alter the balance one way or the other, a task for a naturalistic anthropology is to identify the types of factors that may be involved in such stabilization or changes, and to explain how these factors work by affecting people’s minds and environments.

## Conclusion

Social CCCs are not an aspect of the social. They *are* the social. Things are social to the extent that they are involved in cross-individual cognitive causal chains. Cultural causal chains are not an aspect of the cultural. They *are* the cultural. Social things are cultural to the extent that they are involved in cultural cognitive causal chains. I know of no counterexamples to these claims. On the contrary, I believe they provide a fine-grained way to tease apart what is social and what is not, and within the social, what is cultural and what is not. Moreover, thinking of cultural and social things in those terms—as causal articulations of mental and environmental events and states—should permit the development of a naturalistic ontology of the social.

Social scientists might be concerned less with problems of ontology and conceptual analysis, and more with substantive matters, and in particular with the place given to mental things in an epidemiology of representations. They may feel that I give far too

much importance to representations and cognition in characterizing the social and the cultural; or worse still, that I am reducing the social and the cultural to the mental. Aren't agriculture or war, for instance, paradigmatic examples of things social? Aren't artifacts and public performances paradigmatic examples of things cultural? Yet, without denying their cognitive dimension, surely these are not principally mental things, and their importance has to do primarily with their effects on the bodily lives—not just the mental representations—of people? I fully agree, and if this is thought to be an objection to the naturalistic approach I advocate, then I have failed to make myself understood.

Let me be quite clear. Many things can be caught in a web of social CCCs, not only mental and public representations, but also other public productions, such as paths, buildings, crops, markets, machines, and massacres. All things caught in a social CCC have mind-internal—or psychological—causes and effects, and all have mind-external—or environmental—causes and effects. Which of these causes and effects matter more may vary with specific cases and points of view. In the case of *gomé* chains of events such as those that took place in Albazo's household, much of the explanatory weight lies on the psychological side, even though typically these chains of events are triggered by nonpsychological events or states of affairs, such as a disease or a bad crop. In the case of a path for travel, the psychology is rather trivial and ecology plays a greater explanatory role. After all, in the absence of deliberate maintenance, the stability of paths in a community depends on some balance between the rate of plant growth and erosion on the one hand and the intensity of use on the other. The epidemiological approach must, in all cases, combine an environmental perspective and a psychological perspective and is not committed to—or opposed to—giving precedence to one or the other of these two perspectives.

Why then characterize social and cultural causal chains in term of their psychological links rather than their environmental links? To begin with I would like to stress that psychological links are themselves a subcategory of environmental links. They are links located in brains and bodies that are themselves part of the environment. So, to recognize a special place for psychological links in a social CCC is just to highlight one type of ecological factor. The reason for giving a defining role to psychological links is that the other, nonpsychological links in a social CCC can be indefinitely varied: sounds of speech, gunshots, images, paths, dances, foods, clothes, machines, and so on. No subcategory of these environmental links is either necessary or sufficient for the causal chain in which they occur to be thereby a social chain. What makes a causal chain social is the cognitive linking of different individual minds. What makes a social chain cultural is the (relative) stabilization of representations. It does not follow, however, that the psychological ingredients of the social are more interesting than its nonpsychological ingredients. Interest is a pragmatic matter.



Another concern some social scientists might have is that there is some arbitrariness in distinguishing the social and the cultural and recognizing each as an equally worthy object of study. They might argue that everything that is social is also cultural, and conversely. This is true in the human case, of course. However, in this respect, humans differ greatly from other social animals. Most social animals only transmit information about the here and now (e.g., “beware, there is a predator!”). Whatever knowledge and skills members of these animal populations durably share, they owe to similar biological dispositions expressed in the same environment, rather than to their ongoing mutual interactions. In other terms, the social CCCs of most social animals do not stabilize any common knowledge or skills; they are not CCCCs. Still, there are fascinating exceptions—examples of practices (and therefore of the mental representations that make them possible) spreading through imitation and other forms of social learning and stabilizing in nonhuman animal populations. For instance, it is now well documented that different chimpanzee populations have different, socially transmitted techniques—for termite fishing, for instance (McGrew 1992). These techniques are, in other terms, transmitted through CCCCs. They are cultural. Still, even in those nonhuman animals that exhibit some degree of cultural transmission, most activities, whether individual or social, are free of any cultural influence.

In the human case, and in the human case only, culture is all-encompassing. All social CCCs draw on culturally transmitted representations, even when they do not directly propagate them. The domain of the social and that of the cultural are indeed coextensive. In this extensional sense, there isn’t any difference between social and cultural things. On the other hand, being social and being cultural are two different properties. Something is social to the extent that it involves some cognitively mediated coordination among individuals. Something is cultural to the extent that it involves the stabilization of representations or productions by means of cognitively mediated coordination among individuals.

One may be more interested in the social or in the cultural aspects of things that are inevitably both social and cultural. That is, one may be more interested in answering the question, “How do humans coordinate?” or the question, “How do representations and productions evolve and stabilize?” but the domain of facts relevant to answering these two questions is the same. I have tried to suggest that a naturalistic answer might be given to both questions. For this, the domain of the social sciences must be reconceptualized by recognizing only entities and processes of which we have a naturalistic understanding. These are mental representations and public productions, the processes that causally link them, the social and in particular the cultural CCCs that form these links, and the complex webs of such causal chains that criss-cross human populations over time and space. Start from such a reduced ontology, and, yes, the goal of a truly natural science of culture and society might not be entirely utopian.

## Notes

An earlier version of this text was given as the Radcliffe-Brown Lecture in Social Anthropology 1999 and Sperber (2001b).

1. Since I am never describing the entire complex cause of some event, but only highlighting some part of it, from now on “caused” must be understood to mean “caused in part.”

2. A number of philosophers—Fred Dretske, Ruth Millikan, Karen Neander, and David Papineau for instance—have tried to naturalize meaning by appealing to a notion of function. Although no final and compelling solution has yet been found, I see these attempts as being obviously on the right track. For an overview, see Jacob (1997).

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