

CHAPTER 1

A History of Cognitive Anthropology

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Cognitive anthropology as a distinct area of inquiry is a relatively recent one, dating from the early 1960s. Antecedents exist, of course, even from the beginnings of anthropology in the mid-19th century, but focal questions on mental constructs and their underlying principles have appeared systematically only during the past 50 or so years. Aspects of the early history relevant to cognitive anthropology will be traced below, but some introductory comments are in order. An initial concern is to locate cognitive anthropology within the discipline of anthropology.

INTRODUCTION

Although cognitive anthropology is typically seen as one of the sub-fields of cultural anthropology, that placement has always been problematic. There are two related issues. One is the identification of cognitive anthropology as psychology. While there is a Society for Psychological Anthropology section of the American Anthropological Association, it is relatively small, reflecting the general disinterest or even antipathy of many cultural anthropologists to the discipline of psychology. There are historical grounds for those sentiments. In the late 19th century, anthropology was struggling to become an academic discipline in its own right, which meant independence from an already established psychology. Anthropology needed a perspective or orientation definitive of the discipline and differentiating it from psychology. The concept of culture emerged to play that role. It became the key concept of the discipline, and many, but certainly not all, anthropologists continue to see it in that way.

In addition to competition for departmental independence, anthropologists in the late 19th century were opposed to psychological theory as it was then practiced. Psychologists tended to view the mind as consisting of innate properties. Levels and types

of mental activity were to be explained, through reductionism, as properties of the brain. By contrast, anthropologists saw knowledge as cultural, as socially based, and as mutable. From the beginnings of the discipline, cultural anthropologists were opposed to reductionism, opting instead for radical relativity and for societies with unique sets of traits, to be described ethnographically. The perspective came to be known as historical particularism. While that perspective is no longer in vogue, at least in those terms, opposition to reductionism has remained, and in fact appears to have become more steadfast.

Cognitive anthropologists have also been concerned with accurate ethnographic description, but in addition they have sought principles that underlie behavior. A search for underlying order within kinship systems has been a prime example. Cognitive anthropology is, in fact, reductionist in the sense that observable behavioral phenomena are recognized as expressions of more basic and fundamental underlying organizational order and principles. Differences in perspective between cultural anthropologists and cognitive anthropologists still center on reductionism, but that difference is emblematic of a broader academic issue, humanities versus science. Anthropologists sometimes claim that anthropology is both a humanity and a science (a classic statement is by Wolf 1964), but the two approaches are not equally weighted and valued within the discipline. A good argument can be made that, in terms of number of practitioners and dominant theoretical perspectives, anthropology has always been much more a humanistic than a scientific discipline. Historical factors drive much of the character of the discipline, especially through the idea that ethnography must be qualitative, but cultural relativism plays an even more significant role. At issue is how ethnographic data are to be interpreted, as will be discussed below. The pursuit of explanatory principles in cognitive anthropology differentiates it from cultural anthropology.

The place of cognitive anthropology within the discipline of anthropology, then, has been and remains problematic. The “fit” within cultural anthropology is forced, at best. Given its history and problem of “disciplinary place,” it is perhaps not surprising that claims are sometimes heard that cognitive anthropology is moribund or even dead. An aim of the discussion here will be to present the counterclaim that cognitive anthropology is alive and well and that its place within anthropology lies within scientific anthropology, not within fine gradations of cultural anthropology.

A BRIEF HISTORY OF THE CULTURE CONCEPT: COGNITIVE FROM THE OUTSET

Given that cognition has not been a central topic of inquiry in anthropology, it is perhaps ironic that the first anthropological definition of culture was fundamentally cognitive. That definition was provided by E. B. Tylor, the first academic anthropologist, who was engaged in an intellectual competition for several decades in the 19th century to account for the “place” among humankind of recently “discovered” people of Africa, Asia, and the Americas (1865, 1871). Rather than viewing the people as sinners degraded from a state of grace, he argued that they had not advanced as far comparatively as European folk toward civilization. The concept of culture was a centerpiece of his argument. Culture, in his view, was an intellectual capacity of

humankind, a capacity that allowed all people to become more advanced, eventually to civilization. Tylor's definition of culture was the predominant view of culture for several decades in the early history of anthropology: "Culture ... is that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society" (1871:1). The operant concept is "capabilities," referring to the ability of people to acquire and produce knowledge, beliefs, etc. In contemporary terms, ability would include cognition.

Concerns with definitions of culture reappeared in the 1930s. Cognitive capacity continued to be a central aspect of definitions, expressed typically as "ideas" or "knowledge." In an effort to bring clarity to the abundance of definitions, two leading anthropologists of the time, Alfred Kroeber and Clyde Kluckhohn, produced a book based on extant definitions (1952). They identified 164 complete definitions and 300 partial ones, which they collapsed into a synthetic definition. The definition was too complex and cumbersome to be very useful (Marvin Harris [1968:10] referred to it as a theory), but it is noteworthy that their proposal contained the statement "the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values" (1952:357). As was the case for Tylor, knowledge was at the core. The book, incidentally, provides an excellent and detailed discussion of the history of the culture concept during the 18th and 19th centuries.

Not until 1957 did a definition of culture appear that was intended to support research toward cognitive ends, provided by Ward Goodenough. Anthropology at the time was heavily influenced by structural linguistics, which was often seen as the most scientific of the sub-fields within anthropology. Goodenough saw the structural and taxonomic approaches in linguistics as applicable to cultural phenomena and proposed a definition of culture accordingly: "A society's culture consists of whatever one has to know or believe in order to operate in a manner acceptable to its members, and do so in any role that they accept for any one of themselves" (1957:167). The definition placed culture squarely within knowledge and belief systems but without an iteration of kinds of knowledge or their application. The intent was to encourage anthropologists to produce classification and nomenclature systems to replace the simple iteration of traits. His definition required discovery procedures to identify domains and their content, organization, and underlying features.

THE EMERGENCE OF COGNITIVE ANTHROPOLOGY

The decade of the 1960s was one of change in the linguistic sciences. Linguistics was revolutionized by the work of Noam Chomsky (1965), who redirected linguistic theory from surface descriptions to an underlying, generative, and transformational basis. Sociolinguistics began to be developed as a new sub-field of linguistics and linguistic anthropology (Gumperz and Hymes 1964, 1972; Labov 1972; Blount 1974), searching for social and cultural factors that structured discourse. At the same time, taxonomic linguistic principles were being applied innovatively in anthropology. The intellectual center of the new perspective was at Stanford University, developed in the early 1960s by Kim Romney, Roy D'Andrade, Charles Frake, and their students, including Brent Berlin, David Kronenfeld, and Naomi Quinn, among others.

A second locus later in the 1960s was at the University of California at Berkeley, led by Brent Berlin and Paul Kay. The theoretical perspective was first labeled as "ethnoscience," the study of the ways in which domains of knowledge in traditional societies were distinguished and organized. In time, a number of other labels were applied, including "ethnosemantics," "componential analysis," "lexical semantic analysis," and eventually "ethnographic semantics." A research procedure was established, in which the anthropologist began with a domain such as kinship or color, then elicited exhaustively the terms for the types of objects (kin types, color types) within the domain, followed by an analysis of the components (semantic features) from which the objects are uniquely constructed. Lastly, the psychological reality of the analysis could be demonstrated, through feedback from the folk whose domain was under description. Descriptions of the procedure can be found in the now classic articles by Frake (1962), "The Ethnographic Study of Cognitive Systems" and Conklin (1962), "Lexicographical Treatment of Folk Taxonomies."

A particular interest within ethnographic semantics, perhaps not surprisingly, was in kinship. Kinterms and their determinants has been a dominant theme in anthropology, since L. H. Morgan's monumental work in 1871, to G. P. Murdock's lineage-based account (1949) and sociological approaches in British social anthropology (Radcliffe-Brown and Forde 1950). To touch on only two prominent areas of inquiry within ethnographic semantics, Floyd Lounsbury proposed a formal procedure for kinship analysis (1964b), "The Structural Analysis of Kinship Semantics," and he also carried out a reanalysis of Crow and Omaha kinship systems (1964a), "A Formal Account of the Crow- and Omaha-Type Kinship Terminologies," showing how generational skewing rules clarified some of the terminological challenges of the two systems. In each system, some kinterms are applied to individuals (kin types) in generational levels both above and below ego, a seeming anomaly in kinship systems.

The second arena of lexical semantic analyses of kinship was in a series of publications on American English kinship, providing different outcomes and sharp intellectual debates about relevance. The first publication was by Wallace and Atkins (1960), "The Meaning of Kinship Terms," in which a componential paradigm was presented as evidence of the psychological relevance of the terminological system. Their publication was followed, however, by a publication by Romney and D'Andrade (1964), "Cognitive Aspects of English Kin Terms," presenting a different analysis and an argument for its psychological validity, based on the typological representation of the results and on a series of confirmatory tests given to native speakers. A second discussion on American English kinship was between Ward Goodenough (1965), "Yankee Kinship Terminology: A Problem in Componential Analysis," and David Schneider (1965), "American Kin Terms and Terms for Kinsmen: A Critique of Goodenough's Componential Analysis of Yankee Kinship Terminology." Schneider's criticism was essentially against the formalism of componential analysis, bringing to bear various types of sociological and psychological variables external to a domain-based analysis.

Each of the two sets of discussions is important in the history of cognitive anthropology for the focus of analytic attention to the psychological reality of the native speakers who utilize the terminological systems. Accurate representation of informant knowledge continued to be a central concern in subsequent research, including major advances in color terminology at the end of the decade and in later developments in ethnobiology. The paper by Schneider is important on different grounds, as it

illustrates the types of criticisms that cultural anthropologists tended to make of lexical semantic analysis. Critics argued that the research was focused much too narrowly on single or isolated domains, thereby missing even broader traditional domain based knowledge (see Burling 1964), much less the larger picture and broader concerns of cultural anthropology (Geertz 1973). The core of the latter type of criticism was that formal analysis could never provide overarching cultural descriptions of individual societies of the types expected in information-rich ethnographies. Formal analysis was perceived by critics as too narrow and piecemeal for holistic ethnographic descriptions. The response of cognitive anthropologists was that their method of representing informant knowledge was more principled and thus more accurate, in contrast to impressionistic, non-replicable ethnography.

There were three signal publications in the 1960s. A special publication in 1964 of the *American Anthropologist*, entitled "Transcultural Studies in Cognition," edited by A. Kimball Romney and Roy Goodwin D'Andrade, contained papers on linguistic, anthropological, and psychological approaches to cognition, reflecting the cross-field nature of the field from the outset. The first reader, *Cognitive Anthropology*, edited by Stephen A. Tyler (1969), included many of the classic papers in the emergence of cognitive anthropology. *Basic Color Terms* (1969), was based on the groundbreaking work by Brent Berlin and Paul Kay on color terminology. Their work spawned interest in color terms that continues to the present, and their research helped to usher in prototype theory cognitive anthropology. In 1972 Harold Conklin published a topically arranged bibliography with over 5,000 entries in eight sections, including kinship, ethnobotany, ethnozoology, ethnomedicine, orientation, color, and sensation.

By the 1970s, however, cognitive anthropology had moved away from componential analysis, mainly from their recognition that the results of their research could be seen as enriched lexical semantics but not necessarily of features that actually reflected informant knowledge. A goal of lexical semantics research was to produce an analysis in which each term within a domain could be defined by a unique set of semantic features. In English kinterms, for example, the semantic description of father as "male, generation +1, lineal," mother as "female, generation +1," uncle as "male, generation +1, collateral," et cetera for all of the kinterms, allowed for a taxonomic display of lexical features. There was no assurance, however, that the kinterms were processed cognitively by native speakers in those forms. It seemed unlikely that native speakers relied on sets of lexical features in their mental computation – perception and production – of kinterms. Lexical semantic analyses provided a set of possibilities that might be used for cognitive computation, but there were no principled ways in which one possibility among others could be clearly demonstrated as the most fundamental. Classificational and nomenclatural systems based on feature distributions of lexical items were increasingly called into question, not only in ethnographic semantics but also in linguistics (Fillmore 1975).

By the end of the 1960s, a newer theoretical approach held greater promise for studies of cognition, specifically prototype theory. Cognitive anthropologists began to use the new perspective with the objective, as before, to provide an accurate description of native knowledge. The central aim of the domain-based research remained in place, to characterize knowledge of the types of objects belonging to a domain, including their relationships to each other, but to make the results more psychologically real.

PROTOTYPES

Anthropologists have long recognized that people in different societies do not have the same array of color terms to partition the color spectrum, but until the research by Berlin and Kay (1969), there was no sound basis for understanding the distribution of color terms. The prevailing view for much of the 20th century was cultural relativism, which in circular fashion, merely noted that the array of terms within a particular society was due to cultural factors, generally unspecified. Berlin and Kay began their work utilizing a procedure consistent with the lexical semantic approach used in the 1960s, using hue, brilliance, and saturation as the features of color underlying terminology and classification. They also elicited information directly from speakers of different languages, initially 20 languages. The elicitation techniques, however, were innovative. Each individual was shown the color spectrum as illustrated on a chart containing "chips" (small squares), and was asked to draw on an acetate overlay a line around the range of the chips for each color term in their language, thereby illustrating a boundary. In addition, they were asked to identify the chip that was the best representative of the color indicated by the term, giving a focal point. The results were interesting. Individuals speaking the same language did not draw boundary lines consistently, and across time the same individual did not replicate accurately their original boundary line. By contrast, the agreement on the focal color was much more consistent, both across individuals and by the same individual at different times. Cultural influence was on focal salience to a considerably greater extent than on boundaries.

The result of immediate interest here is that the reliance of speakers on focal salience raises questions about how domains and their classification are to be characterized. If they are not defined by boundaries, then what is the basis or bases for domain identification? Focal salience indicates that the color domain is partitioned not by subsets of boundaries, as thought to be the case in kinship systems, but by focality, a relationship to centrally representative "objects," in this case focal color. This type of object and domain relationship eventually came to be called prototypes, in which a prototypical object becomes the focal point for domain membership of other, related objects.

The results of the color-term study created additional interest in explaining cultural variation. Berlin and Kay initially viewed the distribution of basic color terms across languages and societies as reflecting an evolution toward a larger number of basic terms, fueled by the need for more generic terms as a consequence of societal complexity. They eventually rejected that proposal and turned to questions of neural correlates as constraining the most basic of the terms (Kay et al. 1991). Neural bases, however, did not explain all of the distribution of basic color terms. Extra-biological features are involved, as explored by MacLaury (1991a), who identified a complex of factors that may have influence on the culturally driven aspects of terminology. These include societal complexity, harsh environmental conditions, and abrupt and intense cultural contact. The underlying hypothesis is that a differentiation and expansion of basic color terms will occur when environmental conditions require necessary and close attention for an extended period of time. The hypothesis is not as yet fully tested, leaving the question of cultural relativity not fully answered.

Like color-term studies, research in ethnobiology has a long and productive history in cognitive anthropology, often on the basis of collaborative work between anthropologists, botanists, and zoologists. Similarly, ethnobiological researchers have been concerned with the classificational and nomenclatural distinctions that members of traditional societies make. In addition, ethnobiology addresses questions of constraints on cultural relativity, asking why societies make the distinctions that they do among plants and animals. As in color-term studies, answers required comparative research, but a framework for comparison was less readily available than the physiological and neural bases of color-term perception. Ethnobiological studies of traditional societies have spanned several decades, expanding in the 1970s. By 1980, descriptions were available from a number of traditional societies throughout the world. The most complete were accounts of the Tzeltal Maya of Chiapas, Mexico, from the work of Berlin and associates, especially Breedlove and Raven (Berlin et al. 1966). One of Berlin's graduate students, Eugene Hunn, carried out research on Tzeltal ethnozoology (1977), complementing earlier research on ethnobotany. Particularly detailed studies were also conducted among Jivaro groups in the Peruvian Amazon by Berlin and Berlin (1983) and with the assistance of another then graduate student, James Boster (Berlin et al. 1981).

Aside from descriptions of ethnobiological systems on the basis of intellectual curiosity, one central question was the extent to which traditional systems were similar to the Linneaus system followed in botany and zoology. A simple answer is that native systems were largely similar to the one developed by Linneaus (1735), which is not surprising given that his system was based on European folk models (Atran 1990). A related but more fundamental question was the identification of a system characteristic of folk societies in general. Aspects of an overarching system were identified in publications during the 1970s by Berlin and associates (Berlin 1972), but a full, synthetic picture was not available until the appearance of his book in 1992, *Ethnobiological Classification*. As background on theory, Berlin's major claim is, to quote: "that the observed structural and substantive typological regularities found among systems of ethnobiological classification of traditional peoples ... can best be explained in terms of human beings' similar perceptual and largely unconscious appreciation of the natural affinities among groupings of plants and animals in their environment – groupings that are recognized and named quite independently of their actual or potential usefulness or symbolic importance to humans" (1992:xi).

Berlin's claim is still often not understood and is confused with cultural factors specific to individual societies. Individuals, independent of cultural factors, perceive distinctive morphological features of plants and animals and the discontinuities between them, and they perceive them in highly similar ways. As Atran (1990) and others have indicated, people "carve nature at its joints," that is, they superimpose their perceptual system over the morphological discontinuities seen in nature. The ways in which people in traditional societies superimpose their perspectives are sufficiently similar that Berlin was able to identify and establish seven principles of categorization and five of nomenclature from his review of the extant ethnobiological literature. These principles are definitive of the classification of taxa, that is, kinds of plants and animals, allowing recognition of hierarchically arranged ranks, each of which exhibits systematic similarities in their relative numbers and biological content across all folk systems of classification. Berlin labels the ranks as kingdom, life form,

intermediate, generic, specific, and varietal. The rank *generic* is roughly equivalent to the concept of species within the Linnaean system and contains approximately 80 percent of the approximately 500 taxa in folk traditional systems. The ranks above generic are increasingly inclusive, whereas those below are differentiated. Interested readers should consult Berlin's book and a brief summary is available in an account of cultural bases of folk classification systems by Blount and Schwanenflugel (1993).

Berlin refers to his ethnobiological classification and nomenclature system as intellectualist, to distinguish it from special purpose, cultural-based, or utilitarian classifications. In one sense the distinction is clear. The same objects can be classified in a number of ways, as for example, fish can be a life form, but they can also be classified as a type of food, as an animal to be caught for recreation, and likely in other ways. Classifications of fish other than life form, however, tend to be specific to individual societies, or in other words, cultural. Even more clearly, culture is present in Berlin's categorization at the specific and varietal levels, in part due to the research of Boster (1986). Specifics and varietals are likely to be cultivars, thus receiving special, that is, cultural attention.

The importance of culture, however, continues to be problematic, at least for some ethnobiologists. Confusion arises relative to the defining morphological characteristics of given plants or animals. A utilitarian perspective points to cultural selection of those characteristics among other possible ones that could be chosen. The intellectualist response would be that if the preponderance of folk societies identify the same characteristics, then the selection is unlikely to be cultural. They would ask, in addition, what a given classification is for, noting that if the categorization is not special purpose and if it is part of the categorization of local flora and fauna, it is unlikely to be cultural. While the weight of evidence appears to be on the side of the intellectualist position, culture can still be seen as a possible confound. Not all of the flora and fauna in any traditional society are recognized as taxa (Hunn 1999), raising the question as to why only some are selected, in much the case as why only some basic color terms are present in given societies. Another, in-depth discussion can be found in Atran and Medin (2008).

Although prototype theory as such may not have been central to the development of Berlin's ethnobiological work, his perspective was akin to prototype theory, and in later work (1992), perception of biological taxa were described specifically in terms of prototypes. However Berlin's and Kay's work contributed directly to the development of prototype theory. Eleanor Rosch, initially at the University of California, Berkeley, and then at Stanford University, was a major player in the development of the new theoretical perspective. She defined the concept "psychologically basic level objects," by which she meant objects within a domain that appeared to provide maximum information with the least perceptual effort (1978). Moreover, the objects were perceived not as a list or a bundle of features but as a configurational whole. To test for the reality of basic-level objects, Rosch asked undergraduate students to consider nine three-level taxonomies and for each level to identify features that characterized the objects at each level, for example "tree," "oak, maple, birch," and then types of oak, maple, et cetera. She found that, in general, the basic-level objects, oak, maple, and birch, contained more information than in the other levels. Pursuing the work further, Rosch redefined basic-level objects as prototypes and conducted a second set of experiments in which students rated items within a domain list in terms of their

prototypicality. That led to the now well-known results of passerine birds being judged as the most typical within the domain of birds and of robins and sparrows heading the list of most prototypical (Rosch 1978).

Prototypes replaced clusters of features as the psychological basis for the definition of categories (domains) and their membership. Individuals appear to use a focal representative, a prototype, to define a category and to identify other members of the category according to the degree of similarity to the prototype. As Roy D'Andrade noted in his excellent discussion of Rosch's prototype concept, "it is as if the human cognitive system were a structure seeking device ... [finding] ... which attributes of a class of instances are most strongly correlated and creates generic or basic-level objects by forming a gestalt configuration of these attributes" (1995:120). A consequence of that system is greater cognitive efficiency in categorization. The prototype concept enables cognitive scientists to think in new ways about category construction and membership (D'Andrade 1995:121).

The prototype concept has been utilized constructively in cognitive science fields, especially in anthropology, linguistics, and psychology. Discussions of prototype theory itself have continued. Their role in cultural construction of work meaning can be found in Schwanenflugel et al. (1991), and a broader discussion is provided by MacLaury (1991b).

CULTURAL MODELS

The seminal publication on cultural models appeared in 1987, *Cultural Models in Language & Thought*, edited by Dorothy Holland and Naomi Quinn. As they noted in the preface, earlier versions of the papers had been presented at a conference in 1983, held at the Institute for Advanced Study in Princeton, New Jersey. The edited book contains 15 chapters, including an introduction ("Culture and Cognition") by Quinn and Holland (1987) and a concluding Appraisal by the late Roger M. Keesing (1987). Collectively the chapters have been instrumental in the emergence of widespread interest in cultural models within cognitive anthropology. Cultural models are defined in the introduction as "presupposed, taken-for-granted models of the world that are widely shared (although not necessarily to the exclusion of other, alternative models) by the members of a society and that play an enormous role in their understanding of the world and their behavior in it" (1987:4). The goal of cultural model research is ambitious, no less than a description of the organization of knowledge and its link to what is known about how humans think. Much of the introduction is devoted to an account of what cultural models might be and of how one goes about identifying and constructing them. Multiple topics are discussed in relation to current concerns and issues in anthropology and the cognitive sciences, including research methodology, directive force (cognitive structure and content as motivating behavior), discourse analysis, artificial intelligence and scripts, prototype theory, schemas, and metaphor and metonymy. Each of the topics presaged research emergent in the late 1980s and beyond. The introduction is a tour de force, situating cultural model research within the extant anthropology and cognitive science concerns and projecting future research.

Naomi Quinn, associates, and students have continued their research on cultural models during the past two decades, responding also to criticisms of the original

work. One of the criticisms was that it was not clear how the models, however elegant, could be drivers of behavior. The problem came to be called directive force. To address that problem, a second book was published in 1992, *Human Motives and Cultural Models* (D'Andrade and Strauss 1992). A summary of the findings of the individual case studies by D'Andrade points to two major conclusions. First, directive force can be identified but additional ethnography must be devoted to a demonstration of the linkages between the ideational models and behavior (1992:225). Second, that motivational force is only one of the psychological forces that can be associated with a model. A given model may have also an orientational force, thereby redirecting meanings of events, and evaluative force, providing assessment of qualities such as good or bad. In addition, a given model may have more than one force associated with it, leading D'Andrade to speculate that "as models become more deeply internalized, they tend to include more functions" (1992:226).

A Cognitive Theory of Cultural Meaning appeared five years later (Strauss and Quinn 1997). The book takes aim at the dichotomy in anthropology between meaning as interpretation of behavior in public and culture as organized, structured information in the brain. The dichotomy is clearly false, reflective of the history of anthropology and of the rejection of culture as a meaningful concept. A dismissal of the concept of culture is essentially a denial of the reality of mental concepts and processes, relegating meaning only to what can be perceived in the external world, which clearly is untenable. In fact, Strauss and Quinn demonstrate that leading anthropologists who argue against the utility of the culture concept actually incorporate it into their perspectives and analyses (1997:4). The first two chapters are devoted to the developments in anthropology in the 1960s and 1970s that led to the rejection within cultural anthropology of formal cognitive approaches. Strauss and Quinn, rightly, are especially critical of the role played by Clifford Geertz in the isolation of cognitive anthropology from departments of anthropology. They note that a turning point in the dichotomization of the field was Geertz's criticism of Goodenough's definition of culture, a criticism that erroneously conflated the claim of internalized knowledge with lexical formalism (Strauss and Quinn 1997:254–255). In a direct sense, the formalism of lexical semantic analysis was taken as representative of all cognitive research, and the aim was to dismiss all of it.

The overall aim of the book, however, is neither to be polemic nor to argue for superiority of public or private (mental) approaches to the study of human society. Far from it, the book is an interesting and extensive effort to show that cognitive anthropology is not what its critics have claimed but that centripetal (external) effects of culture, which the critics champion, are a product of interaction between minds and an external world. Strauss and Quinn develop a model based on connectionism, using it effectively to show that human knowledge is constructed from information "in the head" – cultural models – in interaction with the contingent environment. Paraphrasing Strauss and Quinn liberally and referring to the section above on the culture concept, an anthropology that rejects meaning as an interaction between the mind and contingent environment can be seen as a culmination of the distrust against psychology, again apparent from the beginnings of academic anthropology. It is also a political stance taken against anthropological perspectives that attempt to be scientific (reductionist), again, as an aspect of the history of the discipline.

To touch only briefly on the cultural theory of meaning based on connectionism, Strauss and Quinn provided a strong, rationalized account of connectionist perspectives.

Their aim was not to expand or refine connectionism but to use prototypical connectionist models of cognition, in which the building blocks in the model are “units,” activated by the environment (or other units), and which are connected to “weights”; numeric values give differential association between units. Concepts that are learned in the interaction of units are said to be “distributed,” in the sense that the information does not reside in symbols but in patterns of activity (over units). Information processing is seen as occurring both serially and in simultaneous multiple actions (“in parallel”). Lastly the system builds up knowledge by learning associations between the features of a number of specific cases, not by being “taught” specific rules. As Strauss and Quinn note, the approach has been called the “new connectionism” (Quinlan 1991), and it follows the classic work of Rumelhart and McClelland (1986) on parallel distributed processing. The heart of the content of the book is a demonstration of how connectionism can be used to produce models of culture from specific case studies in linguistics, psychology, and anthropology.

A fourth volume, *Finding Culture in Talk: A Collection of Methods*, was edited by Naomi Quinn (2005). The first one-third of the book, approximately 80 pages, is by Quinn and devoted to an expansion of concepts and methods from the 1987 volume, including further explication and development of her cultural model of marriage, likely the most described and elaborated of all cultural models. A chapter by D’Andrade, “Some Methods for Studying Cultural Cognitive Structures,” provides an explicit account of how he sets about methodologically to conduct the research. The focus is on what he calls “contexts of discovery” and “contexts of verification,” following a philosopher of science, Reichenbach (1938). Both are necessary steps in scientific research, though not always necessarily followed. D’Andrade points out that philosophers of science attend more to verification than to discovery, and departments of social science typically have methods courses that do likewise. D’Andrade presents the discovery procedures that he has developed in his long experience in cognitive research. They are presented step-wise and illustrated with a project studying people’s knowledge of the concept of “social equality.” The result is an excellent demonstration of how to pursue “contexts of discovery” and to study cultural cognitive structures.

Cultural model research has developed in several directions. In the cultural model research described thus far, the research procedure is to analyze discourse and search for underlying organizational structure, that is, models. Differences exist, however, in the orientation and scale of the research. Quinn, associates, and students have continued to develop and refine a theoretical perspective and rationale for “finding talk in culture,” resulting in more and more refined and detailed knowledge that allows for identification of very specific models within discourse. In almost completely separate endeavors, environmental and medical anthropologists have used cultural models in their research, largely as methodological tools. This approach aims to mine discourse for shared knowledge within specific domains, particularly knowledge about aspects of the local environment such as the classic study on American environmental values by Kempton et al. (1995). The aim is more extensional than intensional. These two related approaches can be labeled, respectively, discourse-internal and discourse-external.

Model construction has proven useful in ecological and environmental research largely as a way to describe traditional or local ecological knowledge, also called

ethnoecology (Gragson and Blount 1999). For example, work by Michael Paolisso, colleagues, and students at the University of Maryland (Paolisso et al. 2000; Paolisso 2002) uses cultural models as core components of ethnographic content focusing on local knowledge in the Chesapeake Bay relating to fishermen, pollution, and resource management. Linda Garro has used cultural models productively in her research on medical topics (1986), relating these in a methodological paper comparing the utility of cultural models with cultural consensus analysis in her field research (Garro 2000). The use of cultural models has appeared also in agricultural research (Silvasti 2003), mining (Horowitz 2008), fisheries (Blount and Kitner 2007), and a number of studies concerning infancy, childhood, and child-rearing.

When the Department of Anthropology at the University of Georgia created a new doctoral program in ecological anthropology in the early 1990s, cognitive anthropology became the specialization most pursued by graduate students. Whatever their topical specialization (forests, agriculture, fisheries, aid and development programs, ethnobiology, etc.), students realized that they need a principled way to conduct background ethnography in the communities in which they were working. The demand for cognitive training and of how to construct cultural models prompted the author to prepare a working paper on the subject, widely distributed among the students (Blount 2002). An innovative aspect of the methods was to use “keywords” in the search for and construction of models. Keywords are labels commonly used by community members to name and refer to “packets” or “chunks” of knowledge. Keywords serve as pivotal points in construction of discourse, by focusing on topics of the moment, but they also are shorthand for subsumed informational content, information constructed from the encyclopedic knowledge held by individuals. In a direct sense, they name cultural models. Several dissertations were produced by doctoral students at Georgia using keyword analysis to construct cultural models (Dailey 1999; Cooley 2003; Garcia-Quijano 2006).

These approaches based on discourse analysis differ considerably from another type of cultural model research we might denote as elicitation-analytical. Lexical items are elicited from respondents, typically through word listing, and analyses are conducted to determine amount or degree of sharing, through consensus analysis (see Romney et al. 1986; Weller and Romney 1988; Weller 2007). Discourse analysis is seen within this perspective as expensive in terms of time and energy and is thus eschewed.

Following this approach, William Dressler, colleagues, and students at the University of Alabama developed an innovative way to use cultural models in medical anthropology (Dressler et al. 2005). Dressler constructs community cultural models through elicitation and consensus analysis, and then compares the models of individuals against the community norm or standard. As a result, he has measures of what he calls cultural consonance, a quantitative score of how well individual knowledge matches the community pattern. He can then predict that individuals who match least well are the most likely members of a community to suffer from stress and related medical problems.

John Gatewood has developed a set of procedures that he refers to as “cognitive ethnography” (2008). Ethnographic research is conducted in a community, from which cultural models are constructed. The models are tested for “cultural validity,” using cultural consensus analysis. The results are used to inform the construction of questionnaire surveys, which are administered to community members following standard sampling procedures. The idea is to have ethnographically informed surveys.

As an aside, the author developed independently an almost identical set of procedures to construct culturally informed survey questionnaires (Blount and Gezon 2003; Blount 2004). A cognitive ethnography serves as background from which survey questions can be generated. Results from the surveys can be analyzed for clusters of similar or identical responses. The clusters can be seen as packets of shared or common perspectives within communities, thereby constituting approximate cultural models. The distribution of the models reflects degree of similarity, which can then be related to historic and sociodemographic considerations within communities.

CURRENT AND FUTURE DIRECTIONS

Cognitive anthropology has a relatively brief history in anthropology as a focused and named area of inquiry. Throughout the paradigms of research, the overall aim has remained constant, the search for principles that underlie and give order to higher-level observations and behavior. That procedure is inherently scientific, a search for patterns in perceived phenomena and underlying “drivers” that help to account for and explain the patterns. The place of cognitive anthropology within the broader discipline lies within scientific anthropology. If it is forced to be located within the traditional sub-fields of anthropology, the place would be cultural anthropology, but the accommodation has always been strained. The perception of cognitive anthropology as psychology has worked against its standing within anthropology, as has the insistence that cognitive anthropology be scientific. Two ironies present themselves, both in relation to definitions of culture, which have always played a role in the conceptualization of cultural anthropology and its future directions. The first irony is that the first definition that was intended to be directly supportive of cognitive studies, Goodenough’s definition, also served as the means for efforts to disenfranchise cognitive anthropology. The second, broader irony is that from the very beginning of anthropology culture has been seen in its core as ideational. Culture was defined by Tylor as knowledge, shared by individuals, a perspective that has continued to the present day. Cognitive anthropology can be touted as the approach within contemporary anthropology that has made the original and persistent aims of the field its own. Moreover, the current acceleration of interest in the brain sciences has fueled research in linguistics, psychology, cognitive science, and neuroscience, providing an abundance of research questions and possibilities for cognitive anthropology. Opportunities abound for innovative, contributory research.

This historical sketch has not included many recent and current contributions, due in part to space but also due to the coverage of those topics in other sections of this Companion. Particularly constructive contributions have been made in research methods, notably in cultural consensus analysis, often used to test the cultural validity of cultural models, as cited above. A full array of research methods can be found in Bernard (2006), and a recent discussion of cognitive theory and methods can be found in Ross (2004). New, computer-based approaches have been developed to address issues in kinship, in particular the Kinship Algebra Expert System (Fischer and Read 2005; Fischer 2009; Read 2009). Several publications have addressed interesting new questions in cognition and religion (Boyer 2001; Atran 2002; Whitehouse and Laidlaw 2007), and recent work has raised new issues in ethnobiology

(Medin and Atran 1999) and in the cultural construction of nature (Sanga and Ortalli 2003; Atran and Medin 2008). Cognitive linguistics and cognitive anthropology have a deep history on mutual influence. Major works that one may want to consult are Lakoff 1987; Langacker 1987, 1990, 2008; Taylor 1989, 2002; Taylor and MacLaury 1995; Boden 2006; Feldman 2006.

Lastly, several publications beyond those already noted provide in-depth overviews of cognitive anthropology at different stages of its development: Casson's *Language, Culture, and Cognition* (1981), Dougherty's *Directions in Cognitive Anthropology* (1985), D'Andrade's *The Development of Cognitive Anthropology* (1995), Kronenfeld's *Plastic Glasses and Church Fathers* (1996), Shore's *Culture in Mind* (1996), and, more recently, Kronenfeld's *Language, Culture, and Cognition* (2008) and Bennardo's *Language, Space, and Social Relationships* (2009). Mention should also be made of E. N. Anderson's book *Ecologies of the Heart* (1996), in which salient and fundamental elements of culture are identified. They are similar to cultural models, although the terminology differs.

Cognitive anthropology has made significant advances during the past several decades, methodologically and theoretically. While remaining focused throughout on lexical items and how they convey shared meanings, cognitive anthropologists have become more proficient and accurate in the description of those features and processes. The direction of advance is toward better science, in alliance with sister disciplines of linguistics, psychology, and computer science. While better science may not be a premium in contemporary anthropology, the contribution to the discipline is nonetheless noteworthy, especially in the long run.

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