Published in C. Jourdan and K. Tuite (Eds.), 2006 *Studies in the social and cultural foundations of language 23: Language, Culture, and Society,* p. 96-114.Cambridge, UK: Cambridge University Press.

4

COGNITIVE ANTHROPOLOGY

PENELOPE BROWN

Cognitive anthropology across four decades

What is the relationship between language and thought? How do language and other cultural semiotic systems influence the way humans think? How is knowledge organized in the mind, and what is the role of language in constraining this organization? Such questions have stirred an enormous amount of speculation, controversy, and research across a number of fields: especially philosophy, logic, linguistics, anthropology, and psychology. Cognitive anthropology arose as a specific approach to these questions, with well-defined aims and a methodology that focused on exploring systems of concepts through their linguistic labels and comparing them across languages in different cultural settings in order to find their underlying principles of organization.' The field has diversified so that today there are a number of different schools within self-styled 'cognitive anthropology' as well as much work in related disciplines which speaks directly to the same issues. There are certain chronic tensions among adherents of different approaches, especially between (i) those who emphasize universals of human cognition vs. those who stress the importance of cultural differences, and (ii) those who treat cognition as 'in the head' vs. others who insist on its embodied, interactional, and contextually dependent nature. What they all share, however, is an anthropological, comparative approach to the study of human cognition in its cultural context and an insistence on the interaction of mind and culture. This contrasts with the predominant Zeitgeist in cognitive science, with its emphasis on universal properties of human cognition presumed to be innate and very largely insensitive to cultural variability.

There are forerunners to cognitive anthropology, major theorists who formulated anthropological approaches to language and thought and considered them comparatively (especially the American anthropological linguists Boas, Sapir and Whorf, and the French structuralists Hertz, Mauss, Levi-Bruhl, and Levi-Strauss). But cognitive anthropology is today a loose coalition of researchers in several distinct subdisciplines, where developments are converging on a

[1] For contrasting reviews of the intellectual background and origins of cognitive anthropology, see Casson 1981: General Introduction; Dougherty 1985: Introduction; Levinson 1995; D'Andrade 1995: ch. 1; Foley 1997: 106ff; Duranti 1997: chs. 2 and 3.

renewed interest in cognition in its cultural setting. Cognitive anthropology arose in North America in the late 1950s as a movement within linguistic anthropology, one of the four subfields of American anthropology. There was (and increasingly, is) some overlap with research in the related field of psychological anthropology,[2] which historically has focused on the comparative study of affect and the expression of emotion but increasingly is broadening to include studies of cognition (Stigler *et al.* 1990), including neo-Vygotskian studies of practical knowledge (Lave 1988; Suchman 1987; Rogoff and Lave 1984) and the related cultural psychology studies of Cole and Scribner (1974, 1977; Scribner and Cole 1981). There is also some overlap with work in cognitive linguistics (the branch of linguistics emphasizing the cognitive representations underlying language and the encyclopedic nature of meaning), and in developmental psychology (where studies of child development and language acquisition are concentrated). All of this research is heavily influenced by the cross-disciplinary program of cognitive science (the study of how knowledge is represented in the brain/mind); as a result there is increasing exchange of methods and theory across disciplinary boundaries. Indeed, in recent years cognitive anthropologists have looked more to other disciplines than to other branches of anthropology for their primary interlocutors, with especially close links being developed to work in psychology, cognitive linguistics, and artificial intelligence (AI).[3]

There are parallel developments in French anthropology coming out of a longstanding emphasis on cognition. (See e.g. Sperber 1985,1987,1996; Boyer 1993.) Another new development is a re-vitalization of the linguistic relativity issues, sparked in part by strong universalist claims from cognitive scientists blissfully unaware of the extent of linguistic and cultural variation around the world, and in part by cross-linguistic studies of child language acquisition which have shown that languages can vary fundamentally in the semantic parameters that organize a semantic domain and that children show very early sensitivity to such language specificity.[4] Now many of the same questions are being

~ Or the related field of "cultural psychology" (see Shweder 1990 for discussion of the intellectual distinctions among these disciplines). See Bock 1994 for a survey of psychological anthropology that includes cognitive anthropology within it.

[3] After a hiatus of ten years (since Dougherty 1985), there suddenly appeared four excellent new textbooks on linguistic/cognitive anthropology. These survey historical links and current trends from four quite different perspectives, illustrating my theme of increasing diversity in the field. In writing this review I have relied heavily on these textbooks (D'Andrade 1995; Hanks 1995; Foley 1997; Duranti 1997). The first two of these take a narrow view of cognitive anthropology, the latter two take a broader view, consonant with my own, as do four new edited volumes addressing linguistic relativity (Gumperz and Levinson 1996) and linguistic anthropology (Blount 1995; Brenneis and Macaulay 1996; Duranti 2001a). For more interdisciplinary perspectives on language and thought, see, for example, Levinson 1995, Carruthers and Boucher 1998. The most abundant evidence for this early sensitivity is in the domain of spatial language and cognition (e.g. Bowerman 1985, 1996a,b; Bowerman and Choi 2001, 2003; Choi *et al.* 1999. McDonough *et al.* 2003; Casasola 2005; de Leon 2001; Brown 2001).

approached from a variety of subdisciplines. The issues in common include the nature of cultural knowledge, how mental processes affect the organization of knowledge, how different forms of knowledge - including language - affect mental processes (for example, memory and reasoning), how knowledge is used in everyday life, and how it is acquired by children,

In this review I take a broad but selective view, treating as "cognitive anthropologists" those who directly address issues of how cognition relates to language and culture. In what follows I first summarize the approach and aims of cognitive anthropology as originally conceived, and its demise in the early 1970s. Then I review two distinct lines of research, one on cultural models, centered in the United States, the other, new approaches to the question of linguistic relativity focusing especially on recent work on spatial language and cognition, centered in Europe. Finally, I assess the overarching program of these diverse approaches and offer a proposal for future directions in cognitive anthropology.

Classic ethnoscience and its direct heirs

Ethnoscience and "the new ethnography"

Cognitive anthropology originated in the movement within American anthropology, beginning in the 1950s, to revise both the notion of "culture" anthropologists work with and the methods of ethnography. Cognitive anthropology (also originally known as "the new ethnography," "ethnographic semantics," or "ethnoscience") proposed that anthropology should move away from "culture" conceived in terms of behavior or artifacts to "culture" as systems of knowledge, or mental dispositions. The job of the anthropologist was to reconstruct a society's culture, which (in a famous passage by Goodenough [1964:36]) is taken to be:

> whatever it is 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. Culture, being what people have to leam as distinct from their biological heritage, must consist of the end product of learning: knowledge, in a most general, if relative, sense of the term.

The preferred method for investigating such knowledge was through language, especially formal structural semantics (with parallel investigations of cognition often recommended but not usually instantiated). The presumption was that rigorous formal methods would revolutionize the study of human categorization and thereby of mind. The basic strategy was to focus on the taxonomic and paradigmatic structure of categorization systems as revealed through semantic feature analysis, later expanded to prototype semantics. Knowledge was seen as essentially a set of propositions, relatable to each other; the goals were to find the principles that organize culture in the mind and establish to what extent

these are universal. The focus was on the system of rules, with a relative neglect of how these were connected to the environment.

This cognitive anthropological agenda, set initially by Goodenough, Lounsbury, Frake, Wallace, Conklin, Romney, and D'Andrade,[5] lost its impact on mainstream anthropology in the early 1970s, due in part to the contrast between the hybris of its sweeping goals and the limited nature of the studies (lexical semantics of particular domains, predominantly kinship, biological, and color terminologies), and partly to the impoverished view of cultural knowledge. Even within the group of practitioners there was some puzzlement as to the ontological status of the categories being discovered - as to their "psychological reality," and to their degree of sharedness across individuals - as well as a sense that problems were being artificially simplified, "deflecting] attention from the deep complexities of meaning and context and deep questions about the rule-governedness of social behavior" (Keesing 1987:369, see also Keesing 1972). Cognitive anthropology was also attacked by those (e.g. Harris 1968) who objected to the linguistic definition of culture, arguing that anthropology should stick to classic economic and political issues. Another basis for rejection arose in the anti-scientistic trend toward interpretive approaches to the study of culture (e.g. Geertz 1973: 12). Ironically, with the rise of cognitive science, cognitive anthropology - which initially had been taken to be part of the interdisciplinary coalition (Gardner 1989) - became for a while a minority interest.

There are some enduring achievements of the early period, for example, the work on kinship terminologies by Lounsbury, Conklin, Goodenough, and others (see Tyler 1969; Casson 1981), as well as the discovery by Berlin and Kay (1969) of significant universals in color terminology and the work of Berlin and his associates on ethnobiological classification (Berlin *et al.* 1973, 1974; Berlin 1992). The latter two lines of research continue today, retaining the original ethnoscience interest in thought as revealed in the structure of linguistic categories but with a new emphasis on function and use rather than solely on innate principles of human minds. Work in ethnobiology has moved beyond the study of biological taxonomies per se to their relation to ecology and cultural use (Hunn 1985,1995; Atran 1990); that on color terminology has become more broadly comparative.[6] More recent additions to the ethnosemantic repertoire are to be found in the study of terms for emotions (D'Andrade 1995), and interpersonal terms (G. White 1980), leading to the use of multidimensional scaling techniques to show that universal evaluative factors underlie such terms in unrelated languages and cultures. (See D'Andrade 1995.)

[5] See papers in the edited volumes by Hymes 1964; Romney and D'Andrade 1964; Tyler 1969; Spradley 1972; Goodenough 1981 for classic statements of this agenda.

[6] For surveys of recent work on ethnobiological systems see Berlin 1992; Foley 1997; for color see Kay, this volume.

I will focus here on a third "direct heir of ethnoscience" (Quinn 1997), research on cultural models, which has been particularly responsive to critiques of the language-based approach to cultural knowledge and eager to accommodate insights from cognitive science.

Cultural models Work in the "cultural models" paradigm has attempted to counter the presumptions that cognition is necessarily or only interestingly revealed through linguistic analysis, and that cultural knowledge is essentially a set of propositions. The shift is to thinking of meaning in terms that go beyond semantic features and taxonomic relations, to try to capture the cultural knowledge that underlies the understanding of meaning in a domain, knowledge in the form of "models of culturally constituted common sense." Such knowledge is organized as "schemas," a term borrowed from psychology, cognitive linguistics, and AI.[7] "A cognitive *schema* is a generic version of (some part of) the world learned from experience and stored in memory" (Quinn 1997: 4). Casson (1983: 430) is more explicit: "schemata are conceptual abstractions that mediate between stimuli received by the sense organs and behavioural responses,... [and] that serve as the basis for all human information processing . . ."[8] Quinn adds that a "cultural model" (or, equivalently, "folk model," or "ideational system"), a system of connected ideas about a domain, is such a schema which is shared with other members of one's cultural group. By the early 1980s, models in terms of such schemas were being formulated in conjunction with a connec-tionist theory of mental processing, with schemata being seen as constructed by association networks built up from repeated experiences without any necessary reference to language. The method for studying these, however, does involve linguistic analysis, principally discourse analysis of interviews and how people talk about a domain. The domains most thoroughly examined have been in American society where native-speaker intuitions can also be drawn upon; these include Quinn's analysis of the American "ideational systems" concerning marriage and love and Strauss's on work and success (see Strauss and Quinn 1997). Taking cultural models to be "internal representations" of sets of ideas that transform and facilitate complex cognitive tasks has prompted the study of the role of such ideas in the mental processing of reasoning and memory (see D'Andrade 1995: ch. 8), as well as of motivation and of learning (D'Andrade and Strauss 1992). The aim is to include outer world, not just inner mind - the outer world of use, function, and motivation to action; the claim is that looking at the psychological properties of shared cultural ideas allows us to focus on the intersection of outer and inner views.

[7] See, for example, Schank and Abelson 1977.

[8] "Schemata" joins a catalogue of labels for mental entities that includes "representations," "prototypes," "frames," "cognitive maps" (Casson 1983).

With this emphasis on cognitive schemas, and culture as a process of meaning-making that is not necessarily linguistic, work in this area has close links with cognitive linguistic studies of metaphor (Lakoff and Johnson 1980; Lakoff 1987; Quinn 1991; Dirven *et al*. 2003), treating metaphor - a means of viewing one kind of experience in terms of another, of finding coherence across unrelated events - as providing conceptual schemata (or "folk theories") through which humans understand the world. The cultural models perspective also links with that of a number of European anthropologists (cf. Boyer 1993; Bloch 1994,1998) who argue that culture cannot be equated with what is explicitly statable in language. The emphasis here is away from universals, to the significance of particular cultural models for particular forms of thinking. In a similar vein there are also anthropological studies of child development, for example, the work by Harkness and Super (Harkness 1992; Harkness and Super 1996), showing that cultural beliefs about parenting play a role in how children develop. This relates to earlier work on language socialization by Ochs and Schieffelin (Ochs 1988; Ochs and Schieffelin 1990; Schieffelin 1990) which has showed that, from the earliest stages of language acquisition, the deep differences across speech communities in how people use language socializes children to think about and use language in culture-specific ways. Similarly, work on reasoning in different cultural and linguistic settings (Scribner 1977; Hutchins 1980; Bloom 1981; D'Andrade 1989; Hamill 1990) links the logic of patterns of reasoning to particular sets of cultural values and beliefs.

In response to critiques from the "cultural practice" school there is now concern with how cultural models function in "practice," how they are "good to think with," and help humans to perform cognitive tasks like navigating (Hutchins 1983, 1995; Frake 1985) or reasoning (Hutchins 1980; D'Andrade 1989; Quinn 1996). More ambitiously, attention has turned to motivation in human behavior, as influenced by cultural models, and to the investigation of "master schemas" which motivate a wide range of behavior (cf. D'Andrade and Strauss 1992; Quinn 1997; Strauss and Quinn 1997).

This school of cognitive anthropology today, like the founders of ethnoscience, retains the view of culture as knowledge and takes the main question of cognitive anthropology to be "how cultural knowledge is organized in the mind" (D'Andrade 1995:248). To this they have added, however, awareness that not all knowledge is linguistic, that practice as well as codified knowledge is an important part of culture, and that what is most different across cultures is perhaps linguistically expressed, what is more universal is the nature of schemas forming the underlying bases for behavior and practice (Quinn 1997). All these culture theorists concerned with the relationship between culture and language, as Hill (1988:23) points out, "share a 'cognitive' paradigm, in which culture is seen as a set of 'complexly rational' mental phenomena (Dougherty 1985: 3)." Many of them concur in taking these mental phenomena to have the form of hierarchical rules for constructing propositions, some of which are taken-for-granted

and relatively inaccessible to introspection ("constitutive rules"), others are more articulatably normative ("regulatory rules") (D'Andrade 1984).

One important critique of this view of cultural knowledge comes out of work on "cultural practice" by anthropologists and cultural psychologists on how people think in actual situations (for example, Lave 1988; Suchman 1987). This work casts serious doubt on the *intemalness* of thought and the idea that knowledge can be represented by a set of propositions or a set of schemas. Knowledge, in this view, is not just something in an individual's mind. As instantiated in action, in everyday practices, cognition is "distributed - stretched over, not divided - among mind, body, activity and culturally organized settings (which include other actors)" (Lave 1988: 1). Much cognition occurs between individuals and is distributed across them (Hutchins 1995), emerging from their interaction. Furthermore, knowledge resides not only in individual minds, but also in the tools people use (Dougherty and Keller 1985; Keller and Keller 1996); therefore "the proper unit of analysis for talking about how cognition takes place must include the human and material resources that make problem-solving possible" (Duranti 1997:31). Duranti also points out (1997:31) that "the most common way of reproducing knowledge in the world is apprenticeship," learning by doing, a perspective also emphasized in Vygotskian approaches to learning and cognitive development (Wertsch 1985; Rogoff and Morelli 1994).

Another complaint about the cultural models approach may be levelled: The unmotivated basis for *what* one studies the cultural models of, and *whose* models they are. As with the original ethnoscience program, issues of interviewing, sampling, and the social significance of the cultural models they explore are often under-theorized.

Much of the work on cultural models (e.g. in Holland and Quinn 1987) is really addressing the *content* of mind, not *process*. It appears to be little more than old "cultural beliefs," dressed up in new language opportunistically borrowed from cognitive science. A real advance, however, is made in the recent attempts to add process to the structures, to construct (via connectionism) psychological models of how cultural models are tied to emotion (memories associated with feelings), and thereby to motivation, reasoning, and other cognitive processes, and how they are learned. This is very much a cognitive science inspired development, with connectionism the preferred theoretical link and the goal an abstract psychological theory of mental representations. This move has broken the complete dependence of thought on language, as the main things in the mind are no longer taken to be symbols and features, but schemata.[9] The view of the mind, however, is rather hodge-podge, as these units of culture in the mind are not necessarily integrated; in fact "[t]he overall view is one in which culture is seen to be particulate, socially distributed, variably internalized, and variably embodied in external forms" (D'Andrade 1995:248). Indeed,

[9] See D'Andrade 1995: 143-149, 246; Strauss and Quinn 1997: 48-84.

D'Andrade, in an argument recalling modularity assumptions in cognitive science, disputes Geertz's view of culture as an octopus (1995: 249):

> The empirical fact is that culture looks more like the collected denizens of a tide pool than a single octopus __Each cultural model is "thing-like," but all the models together do not form any kind of thing.

However, this insistence on the heterogeneity and non-integration of different aspects of cultural knowledge ignores the fact that some fundamental aspects of cognition, while demonstrably culturally conditioned, *cross-cut* different mental domains. A prime example of these is how humans think, reason, and talk about space, which forms another focus of investigation in modern cognitive anthropology, to which we now turn. This approach has developed out of the original linguistic relativity debate, and doggedly retains the central focus on language as central to mental life and thought. But language is reconstrued, informed by new views of meaning: culture is brought back into meaning and seen as instantiated in communication rather than located in individual minds, with meaning seen as arising in situated interactional contexts (Duranti 1997; Gumperz and Levinson 1991, 1996; Hanks 1995). These modern studies of linguistic relativity with an explicitly comparative methodology are now tied to cross-linguistic studies of language acquisition (Bowerman and Levinson 2001). These have formed a distinct line of research which converges in one respect with that described earlier: in serious attention to findings in cognitive science about how the human mind/brain works and a desire to contribute an anthropological, comparative perspective to the cognitive science enterprise.

Linguistic relativity

This second modern school of cognitive anthropology addresses a somewhat different set of questions: does language - or rather, the grammatical and lexical categories in language - constrain thought? How? How can this be studied? What does it reveal about universals vs. culture-specifics in the nature of the human mind?

The core idea of linguistic relativity, sometimes known as the Sapir-Whorf hypothesis after its two most articulate adherents, is that "culture, *through* language, affects the way we think, especially perhaps our classification of the experienced world." (Gumperz and Levinson 1996: 1) This idea has both entranced and infuriated scholars off and on for centuries. In its non-extreme form (not language *determines* thought, but rather habitual language patterns and ways of categorizing experience *influence* thought) it was at the heart of the ethnoscience program (though not always acknowledged as such), and it went out of fashion in the 1970s with the latter's demise. After a couple of decades of disrepute (see Rosch 1977), it is now "in" again, its rehabilitation due in large

part to the articulate championing of John Lucy (1985, 1992a,b, 1996, 1997b; Lucy and Wertsh 1987; Lucy and Gaskins 2001, 2003). Lucy has reassessed the notion of linguistic relativity, clarified what Sapir and Whorf actually did and did not claim about it, and formulated a rigorous program for empirical investigation to which he himself has made major contributions. In addition, around the year 1997 (the centenary of Whorf's birth), many workshops and conference sessions were devoted to reconsidering linguistic relativity.[10]

The rehabilitation of Sapir and Whorf[11]

Sapir and Whorf are the names most closely associated with the central issue at the heart of cognitive anthropology, the relation between language and thought, and particularly with the claim that the language we speak structures our thought.[12] The original idea - differently articulated by Humboldt, Boas, Sapir, and Whorf -

> was that the semantic structures of different languages might be fundamentally incommensurable, with consequences for the way in which speakers of specific languages might think and act. On this view, language, thought, and culture are deeply interlocked, so that each language might be claimed to have associated with it a distinctive world-view.
>
> (Gumperz and Levinson 1996: 2)

In this sweeping version which makes claims to a grandiose "world view" from the observation of particular semantic patterns in a language, the idea was abandoned in the 1970s, with the rise of the cognitive sciences and the associated emphasis on cognitive universals based in human genes. It was also discredited by the discovery of significant semantic universals in color, eth-nobotanical, and kinship terminologies (Gumperz and Levinson 1996: 3; see

[10] This resurgence of interest spans a number of subdisciplines within anthropology, linguistics, and psychology. In addition to a 1991 Wenner-Gren conference, attended mostly by anthropologists and developmental psychologists and published as Gumperz and Levinson 1996, there was a 1994 conference at the Max Planck Institute for Psycholinguistics attended by developmental psychologists and cognitive anthropologists (entitled "Language acquisition and conceptual development," published as Bowerman and Levinson 2001). There were also at least two sessions at the American Anthropological Association meetings in November 1997 (one entitled "The Implications of Linguistic Relativity," and one "Whorf and the Politics of Relativism"), as well as a 1998 conference in Duisberg, Germany (the 26th LAUD Symposium, on "Humboldt and Whorf revisited: universal and culture-specific conceptualizations in grammar and lexis," published as Piitz and Verspoor 2000 and Niemeier and Dirven 2000), and a conference organized by psychologist Dedre Gentner called "Whither Whorf?" at the University of Chicago in May 1998, published as Gentner and Goldin-Meadow 2003. To quote from a comment by John Leavitt, organizer of one of the AAA panels (LingAnth list, Feb 1998): "The sheer variety of approaches represented this Whorfday suggests that after forty years of controversy over and dismissal of Whorf s ideas by philosophers, linguists, and some anthropologists, the Whorfian legacy seems to be not only solid, but growing in a number of diverse directions." See also Lee 1996.

[11] See Lucy 1992a,b. 1997b: Hill and Mannheim 1992; Gumperz and Levinson 1996; Foley 1997.

[12] See Sapir 1921; Whorf 1956 for their statements.

also Hill 1988; Hill and Manheim 1992). But there has been a recent swing back in psychology, linguistics, and linguistic anthropology toward a position that views diversity in linguistic and cultural practice *within* what has been learned about universals. The new intellectual climate - and greatly increased knowledge about language and about mental functioning - is demonstrated in the interdisciplinary book of Gumperz and Levinson (1996), which explores evidence that different languages code the world with distinct semantic concepts, that these influence cognitive processes, and that a wider definition of meaning - one that incorporates contextual influences on interpretation - provides the basis for a new view of linguistic relativity based in cultural practices, social interaction, and the social distribution of knowledge and understanding (Gumperz and Levinson 1996: 8). There is a shift from theories of context-free lexical and grammatical meaning, which were at the heart of the classic Whorfian studies, to theories of situated language use, distinguishing universal principles from culture-specific characteristics of language use in context. Such universal principles (arguably) may include Gricean conversational "maxims", or the principles governing the sy stematics of conversational turn-taking, or the underlying principles of interactional politeness.[13] But much more seems to be culture-specific, and worthy of investigation as to its effects on cognition. One central focus of study here is indexicality, which anchors meaning to contexts of use; this appears to be a prime site for Whorfian effects. Another is cognition in practice (Lave 1988; Scribner 1992). Another is social interaction, seen as away of externalizing thought, allowing joint solutions to problems. Gumperz and Levinson (1996: 9-10) summarize it as follows:

> Viewed in these ways, the issue of linguistic relativity shifts significantly. From an "inner circle" of links between grammar, categories, and culture as internalized by the individual, the focus shifts to include an "outer circle" of communication and its relation on the one hand to interaction in social settings and on the other hand to individual patterns of cognition which are partly contextually attuned, and even perhaps acquired primarily through patterns of communication, in turn enabling it.

This work on linguistic relativity is thus another attempt to build a bridge between psychology and anthropology, distinct from the school described earlier.

Lucy (1985, 1992b, 1996, 1997b) has provided a sustained critique of the universals bias in cognitive and psychological anthropology on the Whorfian grounds that many universal claims reflect methodological and conceptual pre-sumptions deriving from our own language. He also argues that misconstruals of Whorf invalidated early attempts to test the hypothesis, pointing out that Whorf didn't claim that the world is *perceived* in infinite variety ("kaleidoscopic flux"), rather that it *presents* itself as such and language organizes the

[13] For examples of each of these, see Grice 1975; Sacks, Schegloff and Jefferson 1974; Brown and Levinson 1987, respectively.

flux. Linguistic relativity in Whorf s terms does not rule out semantic universal. To operationalize Whorf's hypothesis, we have to recognize habitual ways of speaking, linguistic patterning on a large scale across different grammatical forms, both covert and overt (as for example, in Whorf's treatment of "time"), and our analysis must be explicitly comparative across at least two languages and cultures. It also requires an articulated theory of nonlinguistic thinking. With such a resuscitated Whorfian program, there have been new attempts to test Whorf's hypothesis that "grammatical categories, to the extent that they are obligatory and habitual, and relatively inaccessible to the average speaker's consciousness, will form a privileged location for transmitting and reproducing cultural and social categories" (Hill and Mannheim 1992: 387).[14] Lucy's own contribution to this program is a study of relativity in number, shown in a careful comparison of the grammar of number in Yukatek and English, and its effect on non-linguistic thinking (Lucy 1992a). Yukatek and English differ in the grammatical marking of number with nouns. Yukatek does not require pluralization of noun phrases, but does require unitization by means of numeral classifiers when they are counted (as in "two long-thin-thing banana," meaning "two banana leaves"). Speakers of English, in contrast, must mark plural for nouns that refer to animate entities and physical objects (boys, rocks, etc.), but not for amorphous substances (sugar, dirt, etc.), which have to be quantified using a classifier-like word (one cube of sugar, one lump of dirt, etc.). Lucy argues that there is a fundamental semantic difference between Yukatek and English nouns: Yukatek common nouns are semantically unspecified for quan-tificational unit, as if they all referred to substances. He therefore predicted that in non-linguistic tasks (e.g. sorting, memory tasks) Yukatek speakers would attend more to the material composition of objects (the "substance" which in speech has to be unitized with a numeral classifier), while English speakers should attend more to their shape (since shape provides the major basis for unitization in English count nouns). Hill and Mannheim (1992:392) summarize Lucy's work as follows:

> Analyzing descriptions of line drawings by speakers of the two languages, Lucy confirmed that the grammatical patterns are in fact reflected in ways of speaking, at least in the experimental context. Experiments using recall and sorting showed that English speakers were more likely to be sensitive to number than to substance, while Yukatek speakers were the opposite. Lucy argued that this result was related to linguistic patterning: English speakers presuppose unity centering on form, and find number changes interesting and noticeable, while Yukatek speakers presuppose substance and are thus somewhat indifferent to number; this is consistent with their characteristic grammatical strategy, which is not pluralization of units, but unitization of substances.

Recently Lucy and Gaskins (2001, 2003) have extended this work to establish the point at which children acquire these different mental propensities. In a

[14] See Hill and Mannheim 1992; Koerner 1992; Lucy 1992a, for surveys of this work.

comparison of the sorting strategies that English and Yukatek children use when confronted with the task of sorting objects of different kinds and materials into "like" and "unlike" categories, they found the two groups behaving the same (both sorting on the basis of shape) up to age seven, but clearly differentiating (English children sorting on shape, Yukatek on material) by the relatively late age of nine. The implication is that children learn to speak their native language fluently and use it for a number of years before a cognitive reorganization takes place where the effects of linguistic patterning on non-linguistic thinking can be demonstrated.

Recent work in related disciplines has taken up the Whorfian flag in certain respects. In developmental psychology the work of Slobin as the major proponent of cross-linguistic studies of language acquisition has been influential.[15] Slobin (1996) argues for a developmental perspective that abandons notions of "language" and "thought" as static wholes, thinking instead in terms of the relation between grammatical categories and the on-line process of converting thoughts into words - a limited Whorfian perspective he calls "thinking for speaking." Grammatical categories may force speakers to encode features that have to be constructed - resulting in cross-linguistic differences, for example, of narrative style, which children gradually acquire by learning to selectively attend (or disattend) to aspects of a scene that their language forces them (or doesn't make them) attend to (Berman and Slobin 1994; Stromquist and Verhoeven 2004). The work of Bowerman and her colleagues (Bowerman 1985, 1996a,b, 2000; Choi and Bowerman 1991; Bowerman and Choi 2001, 2003) has also been important in demonstrating that, cross-linguistically, children do not necessarily make the same initial assumptions about meanings as one would expect if a universal set of semantic parameters provides the basis from which all linguistic meanings are constructed.

Whorfianism, and its limitations, are often illustrated with color.[16] I'll use space, another domain fundamental to human cognition, and equally often thought to be universal.

Spatial language and spatial thinking across cultures Space is fundamental to human life, involving everyday reckoning of where one is, one's internalized geographical map, navigating and route finding, giving route directions, indicating where to find things one is looking for, how to track locations and travels in a narrative, spatial reasoning, and much more. There has been a great deal of work on space in linguistics and psychology,

[15] See especially his five edited volumes containing detailed theoretical and empirical studies of child language acquisition across about twenty different languages and cultures (Slobin 1985, 1992, 1997).

[16] See e.g. D'Andrade 1995; but see Lucy and Shweder 1979. 1988 for a critique.

so that much is known about how it is expressed in different languages and how it is represented in the brain (see Bloom *et al.* 1996; Hart and Moore 1973; Pick and Acredolo 1983). The symbolic uses of space have also been a focus of anthropological enquiry (e.g. Hugh-Jones 1988; Keating 1998). In the spatial domain, languages have fundamentally different linguistic systems for representing spatial relations, reflecting different construals of the same bit of "reality."[17] Now, do these divergent cultural distinctions influence their cognitive characterizations in a way that shows up in non-linguistic tasks of memory and reasoning?

The standard line in philosophy, psychology, and cognitive science presumes that the *universal basis* for spatial cognition resides in the biological structures that come from our mammalian inheritance. The dominant view is that an egocentric perspective is fundamental to human spatial thinking: three planes through the body provide the basis for thinking in terms of space "in front/behind," to the "left/right," and "above/below."[18] This view seems to be supported by (i) modularity in the brain (distinct "what" vs. "where" systems) and (ii) certain linguistic evidence, for example of how children acquire spatial prepositions in Indo-European languages. The conclusion has perhaps *over*-hastily been drawn from these kinds of evidence that the universal basis for spatial language resides in our common human egocentric visual system and constrains how we can think about space.

However, findings from a large comparative study of spatial language and cognition carried out at the Max Planck Institute for Psycholinguistics have cast doubt on the universality of egocentric space as the basis for linguistic systems of spatial description. It turns out that spatial linguistic systems around the world are much more variable than had been presumed (Levinson 1996a, b, c, 1998, 2003a; Levinson and Wilkins, in press). In particular, they differ systematically in their underlying/rames *of reference* (their coordinate systems for reckoning spatial relations). There are at least three major frames of reference, only one of which is egocentric. The three basic frames of reference are *"Relative"* (using the speaker's viewpoint to calculate spatial relations, like the familiar "left"/"right"/"front"/"back" systems of European languages), *"Absolute"* (using fixed angles extrinsic to the objects whose spatial relation is being described, like the cardinal direction systems of many Australian Aboriginal languages), and *"Intrinsic,"* relying on intrinsic properties of objects being spatially related (e.g. parts and shapes of the Ground object, positions of the

[17] See Haviland and Levinson 1994; England 1978 for evidence of this variability within just one language family, the Mayan. See Friedrich 1970, 1971; and de Leon and Levinson 1992, for other Mesoamerican languages; Pinxten *etal.* 1983 for Navajo.

[18] See eg. Clark 1973; Miller and Johnson-Laird 1976. For the philosophical basis, see Kant 1991. Whorf himself seems to have agreed with the mainstream cognitive science view that space was probably universal (Foley 1997: 215).

Figure object)[19] to reckon spatial relations, as in the bodypart systems of many languages.

These three frames of reference are made use of differently in different societies. First, there are different default systems for spatial language across cultures. For example, western speakers of English use mainly Relative and Intrinsic systems, using Absolute only for large-scale geographic reckoning (between, e.g., two cities). But in the Australian Aboriginal language Guugu Yimithirr speakers use only one frame of reference, an Absolute North/South/East/West system which is used both for long-distance and small scale spatial reckoning. (Thus people talk not only of heading "north" or A being located "north" of B; they also routinely say things like "There's a fly on your northern knee" [Levinson 1997b].) Secondly, there are different distributions of systems across functions. Spatial description in different languages and cultural settings may emphasize different frames of reference for small-scale spatial relations, or have different defaults for particular purposes (small-scale vs. long-distance, for example). Thirdly, cognition is related to the default systems. Note that these different frames of reference are not conceptually equivalent: they have distinct conceptual bases (egocentric, object-centered, or geographically centered), resulting in different implications for spatial memory and reasoning (e.g. rotation differences, cognitive maps). They also differ in cognitive complexity.[20] And the second important finding from the Max Planck project is that there is a clear link between what linguistic system is used and non-linguistic spatial cognition. Results on a range of non-linguistic tasks carried out in over ten unrelated languages and cultures show that people think, remember, and reason in the system they use most for speaking with (Levinson 1997a, 2003a; Pederson *et al.* 1998). This is then a prime example of a Whorfian link between language and non-linguistic cognition.[21]

As an example, take the case of the Mayan language Tzeltal, spoken in the peasant community of Tenejapa in southern Mexico. In this community set in precipitous mountain terrain, the main frame of reference is in terms of "uphill" and "downhill." This Absolute frame of reference, based on the overall slope of the land downwards from south to north, is used for both large-scale and small-scale spatial description.[22] Using this abstract conceptual slope, Tzeltal

[19] The terms Figure and Ground in discussions of spatial language derive from the gestalt psychology terms; they refer to the object being located (the Figure) and the object or region in relation to which it is located (the Ground). See Talmy 1983.

[20] Complexity clearly is different for the two-place topological relations of an Intrinsic system (e.g. "at the house's face"), three-place egocentric relations for a Relative system (e.g. "left of the house"), three- or four-place Euclidean grid for an Absolute system (e.g. "north of the house"). See Levinson 1996b, 2003a.

[1] This conclusion, unsurprisingly, has been resisted by some cognitive scientists, due in part to misconstrual of the evidence; see Levinson *et al.* 2002; Levinson 2003b; Majid *et at.* 2004. [22] See Brown and Levinson 1993a,b, 2000; Levinson 2003a; Brown 2001; and Levinson and Brown 1994, for details.

people routinely describe motion as "ascending"/"descending"/"going across," and objects as being "uphill" or "downhill" or "acrossways" in relation to a Ground object, both on sloping and on completely flat terrain. Correlated with this Absolute linguistic system is the fact that on non-linguistic tasks of memory and reasoning Tzeltal speakers have a strong tendency to code in Absolute terms, in contrast to Dutch speakers who code in Relative "left/right/front/back" terms (Brown and Levinson 1993a; Levinson 1996b, 2003a). Other cultural features of this Tzeltal society reflect the absence of left/right distinctions and reinforce the cognitive effects of this Absolute frame of reference: there is a strong preference for left-right symmetry in cultural artifacts (weaving, architecture, ritual), and there is evidence that people are to some degree "mirror-image blind." For example, on a task requiring discrimination between two otherwise identical but mirror-image reversed photographs, Tzeltal speakers routinely say "They are exactly the same" (Levinson and Brown 1994), a result consonant with the fact that these are people who speak a language with no projective left/right distinction and have not been forced by literacy to attend to left/right distinctions.

Given such findings of Whorfian effects in spatial language and cognition, the question leaps to mind: how do children learn to think differently depending on what spatial reference system they learn to use? The mainstream (Piagetian) view is that cognitive development proceeds through universal stages, uninfluenced by the linguistic categories of a particular language; cognitive development precedes, and lays the basis for, linguistic development (Piaget and Inhelder 1967; Laurendeau and Pinard 1970). This view seems to be supported by the order in which children learn spatial prepositions - across a number of European languages, simple *(topological)* ones like "in" and "on" are learned before more complex *(projective)* ones like "in front of'/"behind" (Johnston and Slobin 1979). But a third finding from work at the Max Planck Institute for Psycholinguistics is that children are very early attuned to the semantic spatial categories that their language uses (Bowerman 1996a,b; Bowerman and Choi 2001,2003), and in line with this finding, there appears to be cultural variation in how children learn their spatial linguistic system. Evidence from a longitudinal study of Tzeltal children indicates that they learn the Absolute system relatively early, having productive mastery of the complex sets of semantic oppositions by age four, and the ability to use the system in novel situations on table-top space by between age 5 5 to 7 5. In addition, children seem to learn the Absolute system - the "projective" and therefore cognitively more difficult one - as soon as, or possibly even before, they master their Intrinsic "topological" system, at least as suggested by their linguistic production (Brown 2001; Brown and Levinson 2000).[23]

[23] See also de Leon 1994 for Tzotzil (Mayan). Related work in Bali (Wassman and Dasan 1998) has also shown early learning of an Absolute system and in India and Nepal (Mishra *et al.* 2003).

These findings show that important Whorfian effects can be demonstrated not only at the grammatical level (as emphasized by Whorf, and shown by Lucy) but at the lexical level. Lexical distinctions that require speakers to notice and remember particular aspects of their experience may pervade thinking and memory about, for example, spatial relations. A second point is that, in such an important domain, we may expect to find relations between linguistic concepts and other cultural ideas and practices. In Tzeltal, for example, the language of spatial description in terms of uphill/downhill matches concepts in Tzeltal cosmology, aesthetics, weaving style, agricultural practices, and literacy (Levinson and Brown 1994; Brown 2002b).

It is now clear that three streams of investigation should form part of a serious study of the relation between language and conception in a given linguistic/cultural setting:

(i) Do a linguistic and semantic analysis of a particular conceptual domain (e.g. space) (what are the semantic concepts in the domain, what are their grammatical properties, how are they used in everyday life, how do they relate to other cultural practices?).
(ii) Carry out "experiments" on non-linguistic thinking processes (memory, reasoning, in the domain) and correlate these with the linguistic patterns.
(iii) Look at how children learn the language of the relevant domain: for example, do they go through universal stages in learning the semantics of words in their language? Is their cognitive development -how they develop more complex ways of processing information, and higher-order forms of understanding and reasoning - influenced by their language? Since the limits to cultural variability are in large part dictated by what children can learn, evidence of how they learn semantic and cultural concepts speaks directly to what is and isn't universal about human thinking.

If you want to explore the Whorfian issue there is a fourth essential step: to compare these three-strand investigations across different linguistic and cultural settings. Whorfian effects must be studied comparatively, and non-linguistically as well as linguistically.

Within the modern climate of thinking about mind as made up of separate modules specialized for specific tasks, it no longer makes sense to ask if language influences thought across the board. We must ask the question for specific domains, being precise about our predictions and being sure to test these non-linguistically. There will not necessarily be any effect in realms where, for example, imagistic thought rather than prepositional thought dominates (Keller and Keller 1996). In some realms, language is crucially relevant to cognition; these are the ones where cross-linguistic, cross-cultural studies can reveal important ways in which language influences human cognition. In others, perhaps not (but one must not prejudge which is which; Danziger 2001).

A final methodological point is clear: investigating Whorfian effects requires a strict methodology, with careful design of linguistic and cognitive tasks so that they are tightly linked. Only then may we infer from their connection a model of the mental representation of the particular domain (e.g. space) in the relevant language and culture. Since the object of investigation is not just the content of thought (what people can say about what they think about, e.g. space), but the structure of the mind in a particular domain, an interdisciplinary approach and an eclectic tool-kit is required, including, for any domain studied, serious attention to ethnography and to the context of use and interpretation, interactional evidence of use and contextual variability, non-linguistic tasks to check cognitive effects. Since knowledge has aspects that are both universal (e.g. spatial modules) and culturally particular (e.g. frames of reference), methods for exploring both are required.

Conclusions: The coming of age of cognitive anthropology

Despite methodological quarrels and theoretical diversity, there are clearly common themes in recent cognitive anthropological work. The current trend is toward more integrated theories of mind and culture, along with an insistence on the role of culture (and thereby, of cultural difference) in cognition (cf. e.g. Bloch 1994; Shore 1996; Levinson 1997a, 1998; Brown 2002). The role of culture is being explored not just in the content and structure of mental entities (meanings), but in cognitive processes such as memory, motivation, and reasoning. Work is increasingly interdisciplinary, with attention to the accumulating knowledge about human mental processes within the cognitive sciences (especially cognitive linguistics, developmental psychology, AI, neurophysiology, and evolution). At the same time there is some (healthy) skepticism about exorbitant claims for universals based almost exclusively on work in English-speaking societies, a skepticism that is modulated by enthusiasm for understanding the universal underlying bases for human behavior and cognition. A further trend is attention to how children learn cultural knowledge, and how it affects their cognitive development.

The trends I have described in cognitive anthropology are clearly connected to trends in the broader traditions of anthropology and linguistics, which also have not remained untouched by the cognitive revolution.[24] These include changing views of "language" and "culture," away from monolithic entities to cultural practices located and learned in interaction with others in one's social networks, as well as the deconstruction of culture, with different bases for "common ground," more fragmented, partially shared, ideologically based

[24] There is, for example, work in sociocultural anthropology on literacy, (J. Goody 1977, 1989), on non-language-based cultural knowledge (Bloch 1998; Shore 1996), and even on religion (Boyer 1993) which has been directly influenced by the dominant paradigm of the past half century.

(see Fox and King 2002, for a review). There is also a broadened view of language as social interaction, and a perspective on interpretation rather than on language production, including levels of linguistic patterning invoked by "contextualization cues" (Gumperz 1992), complex transpositions, markers of stance, the cueing of context through subtle, subliminal cues reminiscent of Whorf's view of the subliminal nature of grammatical patterning. These can vary significantly across languages, networks, and cultural groups. It is now taken for granted that the object of study is precisely the complex interplay between inner and outer, individual and environment, between language as resource and language as historical product and process. And finally, these trends include attention to speculations in evolutionary anthropology concerning the evolution of human cognition via social interaction (Byrne and Whiten 1988; E. Goody 1995), the evolution of language (Lieberman 1984; Bickerton 1990a) and the coevolution of mind and culture (Durham 1991). All of these have important implications for how we think about the human mind. I would concur with D'Andrade (1995: 251-252) that: "[0]ne of the main accomplishments of cognitive anthropology has been to provide detailed and reliable descriptions of cultural representations" - one of the original goals of ethnoscience, he comments, that continues today. "Another . . . has been to provide a bridge between culture and the functioning of the psyche." Cognitive anthropology has demonstrated that human thought is influenced by cultural representations, and also that the cultural heritage itself is constrained by our biological capacities and limitations.

I would, however, add that the main challenge confronting cognitive anthropology today is this: what kind of *theory of mind* should anthropologists be developing and contributing to? Whatever its form, it must be more sophisticated and more detailed than theories now on offer in cognitive science (connectionism, modularity, etc.). Furthermore, it must (i) be informed by the new knowledge of universal constraints, (ii) incorporate the range of diversity in human languages and cultural ideas, and (iii) put humans into evolutionary relationship with other animals. Humans have long been preoccupied with the question of what is different about us - a question which up to a century ago would be answered in terms of "the spark of God," the soul. Now the emphasis is on the human mind in relation to the demands of social interaction, especially interactive reflexive reasoning, the pragmatics of meaning in interaction, the externalization of thought in social products and activities. Directly relevant to this emphasis are the new developments in our understanding of the evolution of language, of communicative abilities, culture, and the human mind.[25]

In the eternal tension between universals vs. particulars in language, cognition, and culture we have come to a new cross-road. We are finally moving

[25] See Byrne and Whiten 1988; E. Goody 1995; Durham 1991 for recent evolutionary arguments; see Barkow 1994 for a sketch of related ideas and their importance to psychological anthropology.

away from universals vs. particulars as poles in an argument to the awareness that these must coexist. Even if there are very extensive universal properties of human cognition (as appears to be the case in, for example, the domain of space), these may be accompanied by cognition-penetrating cultural specifics (like the frame of reference used for calculating spatial relations on the horizontal). The human mind is both what we as humans share, which makes us able to interact, understand and communicate across cultural boundaries, and also what separates us, makes us sometimes not understand one another. It is the study of the structures and processes which create and manifest these two sides of the same coin that will take cognitive anthropology forward into the future.