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THE SCOPE OF LINGUISTIC RELATIVITY: AN ANALYSIS AND REVIEW OF EMPIRICAL RESEARCH

JOHN A. LUCY

1 Introduction

The possibility that the language we speak influences the way we think has excited both popular and scientific imagination in the West for well over a century (Lucy 1985a, Aarsleff 1982). Rigorous demonstration of such influences would have profound implications not only for the scientific understanding of human life but also for the conduct of research and public policy. Yet this intense interest and manifest significance have not led to a commensurate volume and quality of empirical research. We still know little about the connections between particular language patterns and mental life – let alone how they operate or how significant they are.

On the one hand, a mere handful of empirical studies address the linguistic relativity proposal directly and nearly all are conceptually flawed in very fundamental ways. Common defects in existing research include working within a single language, privileging the categories of one language or culture in comparative studies, dealing with a relatively marginal aspect of language (e.g. a small set of lexical items), and failing to provide direct evidence regarding individual cognition. On the other hand, both speculation and research have focused rather narrowly on possible links between particular language structures and some measure of cognitive outcome and have ignored two important facets of the problem that must be treated in any full account. A full account must identify the properties of natural language which make diversity possible and give it a crucial role in cultural life. These properties and their consequences will form the cornerstone of any theory about the processes (or mechanisms) underlying the language-thought linkage and indicate exactly where diversity should have effects. A full account must also examine to what extent culturally specific patterns of use – both beliefs and practices – mediate the impact of language structure on thought or have their own direct effects independent of structural type. Understanding the cultural uses of language is essential not only for assessing the particular significance of given structural effects both within and

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across cultures but also for assessing the general significance of language in social and psychological life. In short, empirical research on the linguistic relativity proposal must rectify the existing conceptual problems while expanding the scope of inquiry to include questions about underlying mechanism and cultural significance.

The present chapter reviews existing empirical research on linguistic relativity within such a broadened framework. The first section briefly sketches the implications of having a natural language or not. The discussion indicates that languages are distinctive, in contrast to other semiotic forms, in having a central symbolic component, and that this property both enables language diversity and holds specific implications for the relation of language and thought. The second section reviews in detail empirical research aimed at assessing the implications of having one language as opposed to another, that is, the classic linguistic relativity proposal that structural differences among languages in their categories of meaning have an impact on thought. The discussion indicates some of the reasons for the paucity of empirical research, analyzes the contributions and limitations of previous work, and describes my own recent efforts to improve research in this area. The third section outlines the significance of diversity in the discursive (or cultural) functions of language for actions in and conceptions of the world. The discussion clarifies the role of patterns of use in mediating structural relativity, suggests that variation in usage might have effects in its own right, and provides a framework for and examples of research suggestive of such effects for both the referential and expressive qualities of language. A fourth and final section discusses how linguistic structure and discursive function interact dialectically in conjunction with language ideologies and how such interactions create problems for the research process itself.

2 Semiotic relativity

Attempts to address the question of the significance of language differences for thought must begin with a consideration of the general role and significance of language in human life. Biologists and psychologists have long speculated on the very diverse worlds available to various species by virtue of the disparate sensory stimuli to which they are sensitive and the different neural capacities for organizing, storing, and manipulating such sensory input. As the only species with language, the human perspective on the world may differ not only in terms of such physical characteristics, but also as a function of the availability and use of this qualitatively different *semiotic* form. That is, in the human case, it is important to ask whether the use of the semiotic form we call language

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in and of itself fundamentally alters the vision of the world held by humans in contrast to other species. We can call this the hypothesis of *semiotic relativity*. Although research on the general role of language in human life and thought cannot be reviewed here, it is essential to introduce this perspective into the discussion because the evaluation of the linguistic relativity issue depends greatly on the position one first takes on the implications of having a language at all versus not having one, and then on what features of natural language are regarded as most relevant to thought.

One common view stresses the continuities of human psychology and social organization with that of other species and sees the transformative power of language as very limited. If there are differences in thought between humans and other species, they stem directly from neuro-cognitive differences in the brain, not from the system of symbolic signs which they make possible. Those adopting this perspective tend to see experience as a direct function of perception and cognition operating without language, to regard speech itself as a biological phenomenon with a specific localizable organic base, and to view language as a mere encoding of prior experience so that it may be relayed to others. A large amount of research in the social sciences, especially within the cognitive sciences, operates as if language had such an unproblematic "mapping" relationship to perception, cognition, emotion, social interaction, etc.

Another view, the one adopted here, is that the human sciences are fundamentally distinct from the physical and life sciences precisely because they attempt to encompass a new order of regularity closely associated with the use of the symbolic medium of natural language. This new medium not only adds a new level of regularity, it also transforms existing levels. Thus, where biologists operate with units such as individual organism and social group, the human sciences also explore questions of self and culture, the nature of reflective consciousness, and the significance of historically developed systems of meaning. All of the latter depend centrally on language. Further, the cultural creation of new technologies can neutralize the limits in our biological inheritance by augmenting our perceptual, intellectual, and physical powers, and this, in turn, makes our symbolic world relatively more important. Overall, the new order of diversity and regularity characterizing human life requires new approaches to supplement those of the other sciences.

Ultimately, then, an evaluation of the role of language-in-general in human thought constitutes a necessary component of any research on linguistic relativity. Such research must be informed by a semiotic perspective, that is, a perspective which clarifies the distinctive qualities of natural language in contrast to other semiotic forms and the relationship of those qualities to psychological and social life. From such a semiotic

point of view, the distinguishing feature of natural language is its central *symbolic* component. The more specific distinguishing characteristics of human language inventoried in various accounts (e.g. Hockett 1958) all ultimately depend on or stem directly from this feature. Following Peirce (1932; see also Benveniste [1939] 1971 and Piaget 1973), a *symbolic* sign involves a sign vehicle which stands for some object *only* by virtue of being so taken to stand for it by an interpretant. In other words, the sign–object relationship is established conventionally in a social group rather than motivated by a "natural" connection as in the case of *icons*, where relations of resemblance obtain between the sign vehicle and its object, or *indices*, where relations of co-presence obtain between the sign vehicle and its object. The signal systems characteristic of other species always depend on iconic or indexical linkages of sign vehicle and object for their effectiveness even when also conventionalized to some degree. Human groups also continue to signal by means of icons and indices, so the presence of symbolic signs does not eliminate the presence or significance of the other sign types. Indeed, language itself as a discursive semiotic is also always both iconic and indexical – and these dimensions of language have been the focus of increasing research attention in recent years.

Because they rely on cultural convention for their effectiveness, languages are essentially social rather than personal, objective rather than subjective. This allows language to be a medium for the *socialization* or *objectification* of individual activities – including thought – to the extent that the activities depend on that medium. At the heart of this conventional system lies the symbolic component of language, the part that establishes sign–object relations *purely* on the basis of convention. This central symbolic component makes language an especially *flexible* signaling mode and makes possible the vast formal and functional *diversity* we see across language communities. Finally, because the language sign need not resemble its object or depend on its co-presence, speech can encompass any imaginable object including itself, thus providing the opportunity for *metasemiotic commentary* not only on all naturally based signals but also on itself, a *reflexive capacity* which underlies its potential to create system-internal and -external equivalences. Collectively, these semiotic properties (socialization/objectification, flexibility/diversity, and metasemiotic/reflexive capacity) which all stem from the symbolic dimension of language are the most interesting properties when comparing language with other sign modalities. A linguistic relativity proposal is a natural by-product of such a semiotic perspective. It asks about the significance of the socializing power of the diversity of language forms and functions, especially with regard to providing a vehicle for metacommentary on our actions. Indeed, it is the

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self-reflexive capacity of language which underlies our ability to pose the question, to investigate it, and to transcend it at least analytically, if not habitually (Lucy 1993).

3 Linguistic (or structural) relativity

There are a great many natural languages and they differ in substantial and often surprising ways (Boas [1911] 1966, Sapir [1921] 1949c). In actuality, no person speaks "language-in-general" but always a particular language with its own characteristic structure of meaning. Any investigation of the relation between language and thought must cope with this structural diversity of natural languages by asking whether and to what extent the characteristics of specific languages have an impact on the thought or behavior of those who speak them. We can, following traditional usage, call this the hypothesis of *linguistic relativity* as long as we understand that by the term *linguistic* we mean the formal *structure* of semantic and pragmatic categories available for reference and predication. Where there is a potential for ambiguity in this review, the term *structural relativity* will be used in place of *linguistic relativity*.

3.1 Paucity of research

Despite the long tradition of thought and speculation about the implications of structural diversity among languages, there is little actual empirical research and most of it is poorly done. If we restrict ourselves to studies that compare at least two languages and the modes of thought associated with them, there have been only half a dozen studies in the last fifty years (Lucy 1992b). This situation is remarkable given the intense interest in the linguistic relativity issue. In such a context, it makes little sense to speak of the linguistic relativity proposal as having been empirically decided one way or the other at the present time.

The main impediment to research in this area has been the widespread, if tacit, acceptance of certain limiting assumptions about the relationship between language and thought generally. Since the late 1950s, main-stream psychological, linguistic, and cognitive science research on this issue has been guided by three closely linked assumptions which derive ultimately from deep-seated cultural orientations but which received renewed impetus from Piagetian developmental psychology and Chomskian generative linguistics (Piaget [1954] 1967, Inhelder & Piaget 1958, Chomsky 1972). First, there has been an assumption that basic cognitive processes are universal. Any variability in performance across populations is ascribed to mere differences in content. Second, these traditions have assumed that thought shapes language. Thus, when interesting correspondences emerge between cognitive performance and a

given language (e.g. English), they are routinely interpreted as having been determined by cognition. Third, these traditions assume that all languages must be fundamentally alike. This assumption may follow from the first two or may be independently posited. Since, by assumption, languages do not vary significantly, there is little reason to investigate their diverse forms.

One might expect a critique of this presumptive universalism from anthropologists and comparative linguists who are, as groups, less willing to discount linguistic diversity. Yet few are prepared to engage directly in the discourses of the other fields and many are reluctant to challenge the universality of cognitive processes given historical experience with evolutionary and racial interpretations of purported differences in mentality. By contrast, ideological universalism is ethically well received – its sometimes disastrous effects in our own century notwithstanding. Unable to mount a sophisticated critique of the notion of "basic cognitive processes" itself, or to challenge effectively the "mere content" view of cultural and linguistic differences, the aforementioned assumptions persist along with their chilling effects on research, public policy, and respect for other languages and cultures.

3.2 Review of existing research

Although concern with linguistic relativity has had a long history in the West, contemporary empirical research begins with the work of Benjamin Lee Whorf (1956a, b, Lucy 1985b, 1992b). Nearly all subsequent research has been stimulated by his work and takes it as a point of departure. This subsequent work can be divided into two broad groups: research done by anthropological linguists and research done by psycholinguists.

3.2.1 Whorf
Whorf conceived of his research as part of the larger anthropological project of documenting and understanding languages and cultures different from our own (cf. Fishman 1982). His predecessors Franz Boas ([1911] 1966) and Edward Sapir ([1924] 1949a, [1929] 1949d, [1931] 1964) speculated about the impact of language on thought, but Whorf was the first to try to demonstrate actual correspondences between the structural features of languages and specific modes of thought.

In his research Whorf (esp. 1956a) compared the formal meaning structures of *two languages* and then traced connections between such meaning structures and *habitual thought* as manifest in various cultural beliefs and institutions. For example, he showed that the Hopi and English languages encoded what we call "time" differently and that this corresponded to distinct cultural orientations towards temporal notions. Specifically, Whorf argued that speakers of English treat cyclic

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experiences of various sorts (e.g. the passage of a day or a year) in the same grammatical frame used for ordinary object nouns. Thus, English speakers are led to treat these cycles as object-like – they can be measured and counted just like tangible objects. English also treats objects as if they each have a form and a substance. Since the cyclic words get put into this object frame, English speakers are led to ask what is the substance associated with a day, a year, and so forth. Whorf argues that our global, abstract notion of "time" as a continuous, homogeneous formless something can be seen to arise to fill in the blank in this linguistic analogy. The Hopi by contrast do not treat these cycles as objects but as recurrent events. Thus, although they have, as Whorf acknowledged, words for what we would recognize as temporal cycles (e.g. days, years, etc.), their formal structuration in the grammar does not give rise to the abstract notion of "time" that we have. (Critics of Whorf's Hopi data [e.g. Malotki 1983] have managed to miss completely his point about structuration.) In Whorf's view, grouping referents and concepts as formally "the same" for the purposes of speech has led speakers to group those referents and concepts as substantively "the same" for action generally, as evidenced by related cultural patterns of belief and behavior.

Notice finally that there is an additional element to Whorf's formulation beyond language and thought: a *reality* against which the two linguistic patterns are tacitly compared but which was not itself seriously analyzed or explicated by him. The cyclic events and subjective experience of duration that he refers to are never fully analyzed. The practical consequences of this neglect are mitigated somewhat because he did not privilege either of the two languages but rather played them off against each other to establish his comparison. Herein lies the nucleus of a procedure for establishing a neutral basis for the comparison of language–reality relationships, a nucleus that has yet to be fully exploited. In short Whorf laid out the basic design of an approach to empirical research on linguistic relativity.

3.2.2 The anthropological linguists

Other anthropological linguists who subsequently explored Whorf's proposals continued to link grammatical structures to broad cultural patterns. However, on the whole these studies examined a single grammatical form in a single exotic language and thereby effectively abandoned the effort to analyze a widespread grammatical pattern or to make systematic cross-linguistic comparisons. So, for example, in a classic study, Harry Hoijer (1953) examined a category concerned with motion in the Navajo verb and then sought evidence of parallels in the "motion" motifs in Navajo myths and nomadic history. It remains

unclear in studies of this sort how significant the grammatical pattern is in Navajo and how distinctive it is in comparison to other languages – especially those spoken by culturally similar groups. Further, since there was no actual comparison of languages, the issue of a common reality (e.g., what counts as "motion") against which they could be assessed is not explicitly raised. More recent work on "motion" in Navajo language and culture (e.g. Witherspoon 1977), whatever its other merits, suffers from the same difficulties.

Research in the anthropological tradition also typically did not provide clear evidence for a non-linguistic correlate with grammatical patterns. Cultural analyses were either nonexistent or dominated by the use of linguistic materials as, for example, in the use of myth texts by Hoijer. In several cases, a purported relation between language and culture would turn out, under scrutiny, to be a relation between the grammatical structure of a language and the lexical structure of the same language (e.g. Mathiot 1964). An adequate study of the relation between language and thought should, by contrast, provide clear evidence of a correlation of language system with a pattern of non-linguistic belief and behavior – individual or institutional. This is not to say that vocabulary items do not reflect non-linguistic culture or that discourse using language does not provide important evidence about cultural beliefs, but only that, from a methodological point of view, such materials cannot be persuasive by themselves in showing broader effects of language. Much of the otherwise excellent recent anthropological work (which will be discussed further below) focusing on the creative play of grammatical categories in discourse or linking language structure to "linguistic ideologies" suffers from a similar lingua-centrism.

In sum, by contrast with Whorf's formulation, the anthropological case studies have developed a truncated approach to the relativity problem. Thought has been assessed by reference to linguistic materials, the comparative dimension has been eliminated, and the tacit framework guiding the analyses has been an English-based view of reality. Only the linguistic analyses have had any depth to them as each author explored the interconnected meanings implicit in the structure of an exotic language and, in more recent years, expanded the focus to the complex uses of language in cultural action.

3.2.3 The comparative psycholinguists
Psychologists exploring Whorf's proposals abandoned his focus on large-scale structural patterning in languages and focused instead on small sets of lexical items or, rarely, on specific features of grammar. In either case, they usually worked with only a single language, most often English. These researchers also criticized Whorf for not assessing individual

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3.2.3.1 Research on lexicons

Most psycholinguists working in this area shifted completely away from the sort of grammatical data central to Whorf's work and focused on lexical items – especially terms for colors. The meanings of these lexical items were established not by grammatical analysis but by reference to their typical denotational values – the "objects" they refer to. So, for example, American subjects were asked to list their color terms and then, subsequently, to show which of a set of color samples they applied to. Ironically, then, *lexical content* which had served to represent non-linguistic "culture" for some anthropological linguists now served to represent "language" for these psycholinguists. Needless to say, a half-dozen color terms is a rather poor representative of "language."

In the most famous of these studies, Brown & Lenneberg (1954) tried to show that certain colors were more codable than others in English – that is, subjects assigned them shorter names and tended to agree more on the application of those names to color samples. The more codable colors were recognized and remembered more readily than other colors. As one of the few rigorous studies purporting to show a cognitive effect in a field dominated by speculation, this work had enormous influence on subsequent research.

Yet notice how different this research is from Whorf's. The shift to studying codability (i.e., intersubject agreement in lexical denotation) was undertaken to simplify the research process, but it fundamentally altered the terms of the problem. First, the only "linguistic" variable remaining in the later studies in this tradition was the "code efficiency" of a set of lexical items used as labels for stimuli. Only stimulus input (a color) and behavioral output (correct or incorrect memory) were actually relevant. No evidence was presented that these forms constituted a distinctive, grammatically integrated set in the language. Second, this approach explicitly relied on a Western scientific characterization of reality (i.e., the color space). Because the conceptualization of language forms was in terms of an independently known and defined reality based on European languages, the whole approach undermined *in principle* the possibility of discovering genuinely different linguistic approaches to reality. Third, the tradition initially omitted any comparison of languages. Typically only one language received serious analysis and sometimes there was no linguistic analysis at all! (Some might count the work of Lenneberg & Roberts 1956 and Steffire, Morely, & Castillo 1966 as exceptions to these generalizations.)

Extensions of the early color work by anthropologists Berlin, Kay, their collaborators, and critics (Berlin & Kay 1969, Kay & McDaniel 1978, Heider 1972, Lucy & Shweder 1979, 1988) generated the first broad multilanguage comparative framework to actually be applied to the relativity question and one comparative case study by Heider (1972) of the relation of language and thought. However, this comparative work still retained the lexical orientation and fundamentally Western conception of "color" characteristic of the earlier era. Rather than working from a comparatively induced typology of patterns of language–world relationships, it showed instead the distribution of languages relative to a fixed set of parameters drawn from the Western European scientific tradition.

So despite its comparative orientation, it actually washed out linguistic differences and suggested that languages merely "reflect" or "map" reality. Whereas Whorf begins with the language structure and asks what it suggests about the implicit construal of reality, these studies begin with *our* reality as a given and ask how other languages handle it. Inevitably, this latter approach leads to a conceptualization of language as a mere dependent variable, as a device for coding a pre-given reality.

Some examples of what is lost in this approach to language semantics through a highly controlled denotational task may be helpful. Zuni, a language of the American Southwest, exhibits two terms that we might translate as 'yellow' (Newman 1954). Closer analysis reveals that one term is verbal and refers to things that become yellow by ripening or aging whereas the other is adjectival and refers to things that have had yellow substances applied to them. The customary approach would select one term as "basic" (eliminating the other "nonbasic" term from further consideration) and ignore the aspect of its meaning (i.e., manner of becoming colored) for which there is no English equivalent. Hanunóo, a language of the Philippines, has four terms that seem to refer to what we call *white, black, green,* and *red* but which under further analysis turn out to mean roughly 'lightness, darkness, wetness, and dryness' (Conkin 1955). These terms can then be used to discriminate color chips but this hardly reflects their central meaning. Turning to English, we have many words that have color reference as a central part of their meaning, but which also involve other meanings (Lucy 1992b). Consider for example *blond, brunette, bay, sorrel, palomino, appaloosa, maroon, scarlet,* etc. In fact, if we look broadly across a wide array of languages, we would conclude that the real *linguistic* regularity is that terms with color-relevant meaning routinely seem to combine these meanings with plant and animal referents or with other textural and light qualities (Lucy in press). The emergence of terms specialized for reference to color in some languages is of course interesting, but can hardly be taken as the standard

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An approach that carries an array of color stimuli around the world and asks people for the words that effectively discriminate among them (and do nothing else) will wash out all these linguistic patterns. It will inevitably confirm that pure color terms are a universal part of language with much the same sense as our own specialized terms since any variation that is observed will by definition lie *within* the Western-defined domain. The research procedure itself precludes any alternative finding. Notice too that radically different languages will tend to look deficient by comparison with our own to the extent that much of their descriptive vocabulary is eliminated from consideration. Although this research was important in highlighting the need for a comparative metalanguage of description, it did not, in the end, provide an adequate framework for the purposes of assessing relativity.

The Brown & Lenneberg study also inaugurated a tradition of assessing thought by presenting individual subjects with experimentally controlled memory tasks rather than by analyzing naturally occurring patterns of everyday belief and behavior. This use of experiments provided more control over some of the variables affecting performance but was accompanied by a shift of the research emphasis away from Whorf's concern with *habitual* thought and behavior and towards a concern with *potential* thought and behavior. So, in the cognitive realm, as in the linguistic realm discussed above, the search for methodological rigor led to a fundamental reformulation of the problem. The considerable gains in control were offset by the ambiguous status of the experiments as representations of habitual behavior, that is, as culturally valid representations of thought.

3.2.3.2 Research on grammar
Through the 1970s only a few of these psychological studies explored (rather inconclusively) the cognitive significance of grammatical patterns or systematically compared two or more languages (e.g. Carroll & Casagrande 1958). Those researchers who did so retained the preference for experimental assessment of individual behavior characteristic of the psycholinguistics tradition. Unfortunately, their linguistic analyses also showed exactly the same weaknesses as the anthropological studies cited above in that no attempt was made to relate the categories at issue to other categories in the language or to similar categories in other languages. Thus, each study only described a single categorical distinction in a single language even when behavioral data were collected on two or three language groups. In each case, the tacit metalanguage for

linguistic characterization was "reality" (a world of objects) as construed in or viewed from English.

More recently Alfred Bloom (1981) and others (Au 1983, Liu 1985) have explored the relation between certain types of counterfactual markers in Chinese and English and speakers' facility with hypothetical reasoning. Bloom used an experimental design where he presented stories to English and Chinese speakers with the Chinese receiving translations of English texts. English speakers did better at the counterfactual reasoning tasks, and Bloom then generalized to the utility of systematic marking of counterfactuals to sustain theoretical, specifically scientific, modes of thought. However, since the stimulus materials were not absolutely identical in the two cases, his approach led to a number of ambiguities. Critics raised questions about whether certain of the Chinese sentences really meant what he claimed they meant. These disputes quickly degenerated into an unresolvable battle over the accuracy and fairness of the Chinese translation of the English constructions (see review in Lucy 1992b). There is no way to resolve such disputes except by appeal to what speakers would actually typically say about a concrete situation; but this could not be tested since the counterfactual stories by definition did not correspond to any observable events.

Further, a close reading of Bloom's original materials reveals that the various linguistic devices he describes do not form a structural set in grammatical terms but can only be identified by reference to their common use in a certain discourse mode. Further, the differences in how much counterfactual discourse the two groups engage in and how they value it seem much more telling than any structural differences. Despite the ambiguity of Bloom's results, his approach was especially significant in that experimental work and cultural analysis were brought together for the first time.

3.3 Towards a new approach

From this brief survey of previous empirical research we can abstract the requirements for an improved approach to research on the cognitive implications of structural diversity among languages. Such research should be comparative in that it should deal with two or more languages. It should deal with a significant language variable such as one or more central grammatical categories rather than a relatively minor vocabulary set. It should assess the cognitive performance of individual speakers aside from explicitly verbal contexts and try to establish that any cognitive patterns that are detected also characterize everyday behavior outside of the assessment situation. Finally, studies that deal with referential categories, that is with categories which denote objects and

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relations in the world, rather than with categories having to do solely with language-internal relations, will provide a variety of advantages for empirical research in terms of developing comparative frames and cognitive assessment procedures.

Over the past several years I have developed a systematic approach to the investigation of the relation between such diversity in language and thought with the aim of filling the gaps in our knowledge and methodology (Lucy 1992b). The research aims to be absolutely explicit about what features of language are significant for thought and how they are significant. These studies combine careful comparison of well-defined aspects of grammar with rigorous demonstration of highly distinctive patterns of perception, classification, or memory.

My first major empirical research using this approach (Lucy 1992a) explored the ways structural differences between American English and Yucatec Maya might affect the cognition of speakers of those languages. The research shows that these two languages encode objects in quite different ways and that these differences affect the nonverbal cognitive performance of adult speakers. Specifically, the research focused on the relationship between grammatical number marking and patterns of memory and classification in tasks involving objects and pictures. Since a great many languages in Asia and the Americas share the Yucatec pattern (Lyons 1977) and most European languages share the English pattern, these differences hold important implications for a broad array of languages.

English and Yucatec differ in their number marking patterns. First, the two languages contrast in the way they signal plural. English speakers *obligatorily* signal plural for a *large number* of lexical nouns whereas Yucatec speakers *optionally* signal plural for a comparatively *small number* of lexical nouns. Specifically, English speakers mark plural for nouns referring to animate entities and ordinary objects but not for amorphous substances (e.g. *sugar*, *mud*, etc.). Yucatec speakers sometimes mark plural for animate entities (although it is not obligatory even when referring to multiple referents) and only occasionally mark it for any other type of referent.

In nonverbal experimental tasks involving complex pictures, Americans and Mayans were sensitive to the number of various types of objects in accordance with the patterns in their grammar. The pictures showed scenes of everyday Yucatecan village life and contained different numbers of referents of the various types. Speakers performed tasks which involved remembering the pictures (recall and recognition) and sorting them on the basis of similarity. In remembering and classifying, English speakers were sensitive to number for animate entities and objects but not for substances. By contrast, Yucatec speakers were sensitive to number

only for animate entities. Note in this experiment that the two groups had very similar patterns of response for the animate and substance referents where the two languages roughly agree in structure, but that they differed with respect to ordinary object referents, that is, where the grammars of the two languages are in maximal contrast. So the group difference is not one of absolute level of performance, but rather of different qualitative responses. Neither group's performance can rightly be regarded as superior or inferior – just different.

Second, the two languages contrast in the way they treat numerals and this contrast derives from a deep underlying difference between the two languages. English numerals directly modify their associated nouns (e.g. *one candle*) whereas Yucatec numerals must be accompanied by a special form usually referred to as a *numeral classifier* which typically provides crucial information about the shape or material properties of the referent of the noun (e.g. *'un-tz'iit* kib', 'one **long thin** candle'). Numeral classifiers are a well-known grammatical type and occur in a wide variety of languages throughout the world, perhaps most notably in the languages of Asia – Chinese, Japanese, Thai, etc. In my view, the classifiers reflect the fact that *all lexical nouns in Yucatec are semantically unspecified as to essential quantifications unit.* In the case of nouns with concrete reference, it is almost as if they referred to unformed substances. So, for example, the semantic sense of the Yucatec word *kib'* in the example cited above is better glossed as 'wax' (i.e., 'one **long thin** wax') – even though when occurring alone without a numeral modifier it usually refers to objects with the form and function that we call "candle." Once one understands the substance focus of such nouns it becomes obvious that one must specify a unit (i.e., provide a classifier) when counting (i.e., 'one wax' would not make sense). By contrast, many concrete nouns in English include the notion of 'unit' or 'form' as part of their basic meaning – so when we count these nouns, we can simply use the numeral directly without any classifier (e.g. *one candle*). Where our pattern is like the Maya, we use the functional equivalent of a classifier ourselves: *a cube of sugar*.

In experimental tasks involving classifying triads of certain test objects (i.e., "Is item X more like A or more like B?"), English speakers showed a relative preference for shape-based classifications whereas Mayan speakers showed a relative preference for material-based classifications – results in line with the expectations based on the underlying lexical structures of the two languages. So, for example, speakers were shown a small cardboard box of the type used for holding cassette tapes and asked whether it was more like a small plastic box of roughly the same size and shape or more like a small piece of cardboard about the size of a half-dollar. English speakers consistently matched on the basis

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of shape and chose the box. Yucatec speakers consistently matched on the basis of material and chose the small piece of cardboard. The same sorts of preferences also emerged in other more indirect tests. Also, once again, both patterns of classification are reasonable and neither can rightly be described as superior to the other.

Notice that this research begins with a linguistic comparison which places both languages on an equal footing. It locates and then examines in detail a pervasive and semantically significant lexico-grammatical contrast, one patently relevant to a wide array of other languages. It does not attempt to work within a single language, nor take English as the standard for assessing other languages, nor focus on a minor or rarely occurring category. It then asks about the possible implications of the linguistic patterns for the interpretation of experience generally. These implications are then converted into specific qualitative predictions about the nonverbal performance of individual speakers of the languages – both where they will be similar and where they will be different. These predictions are then tested with an array of simple tasks using materials designed to maximize real-world interpretability. The research does not simply look for language effects in other verbal behaviors, nor does it frame the assessment in terms of deficits, accuracy, or a hierarchy of complexity, nor does it undertake the assessment without serious consideration of the cultural context. In short, although much remains to be done especially with regard to tracing broader cultural ramifications of these patterns, the study articulates an approach to research in this area that remedies many of the deficiencies of earlier work.

In current research I am extending this work to new grammatical categories, exploring the ontogeny of these patterns in childhood, and tracing links between the linguistic forms and traditional Maya cosmology. For example, one of the more exciting side benefits of establishing an adult contrast of the sort just described is that it can be used as a diagnostic for the onset of language effects during cognitive development. In collaboration with Suzanne Gaskins (Lucy 1989), I have recently completed pilot research on the developmental course of the language–thought connection. Comparing Mayan and American children, it appears that young children in both groups favor shape over material as a basis of classification but that a pronounced change occurs by the age of eight. No child under the age of seven favored material as a basis of classification. In the Mayan case, there is a shift from the age of eight onward to classifying on the basis of material just as do Mayan adults. In the English case, the early shape preference weakens at the age of seven with the emergence of wide variability in individual response pattern. This variability is consistent both with the English grammatical pattern (which splits its lexicon) and with the observed variability in the

adult English sample. However, it is also overtly similar to the pattern for young children in both groups and further work will be necessary to adequately characterize the English population and distinguish it from the shape-preference characteristic of younger children. Pooling all ages from three to twelve, the Maya were more likely to classify on the basis of material than were the Americans for ten out of the twelve triads. This pilot research not only further substantiates the original work, it also gives us some insight into when these grammatical patterns begin to play a shaping role in cognition. Recent work by Imai & Gentner (1993) using similar materials on Japanese, another classifier language, found similar material preferences – at least for some object-type referents – and increased sensitivity to material-based alternatives as early as the age of two in language-learning contexts – in contrast to English-speaking children. These results suggest that the original findings may generalize to other languages.

4 Discursive (or functional) relativity

There is more to language than its structure of reference and predication. There is another dimension of language variation that deserves our attention. Even within a single language, there is always diversity in the ways it is used. These differences in usage may be associated with subgroups in the language community (social *dialects* – e.g. class-characteristic modes of speech) or with differences in contexts of speaking (functional *registers* – e.g. formal discourse) (Halliday 1978). There are further differences in patterns of usage when we compare diverse linguistic communities (Hymes 1974, Gumperz 1982, Gumperz & Hymes 1972). Any investigation of the relation between language and thought must also cope with this level of functional diversity in natural languages. The question is whether patterns of use have an impact on thought either directly or by virtue of amplifying or channeling any effects due to linguistic structure. We can call this the hypothesis of *discursive relativity*, a relativity stemming from diversity in the *functional* (or goal-oriented) configuration of language means in the course of (inter)action.

4.1 Early formulations

Although there has been a long history of concern with language functions within anthropology (e.g. Malinowski 1923), anthropological linguist Dell Hymes (1961, 1966) was one of the first to argue that any claims about linguistic relativity of the structural sort are dependent on certain commonalities in the cultural uses or functions of language. Thus,

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proposals about structural relativity require assuming a loose isofunc-tionality across languages of the everyday use of speech to accomplish acts of descriptive reference. There is now a significant body of research indicating that there is in fact substantial cultural diversity in the uses and valuations of language.

Similar arguments have been made for the intellectual effects of variation of usage *within* a single language. For example, there have been broad claims by psychologist Lev Vygotsky (1978, 1987) and others for the significance of literacy, formal education, and technical–scientific language for thought. Likewise sociologist Basil Bernstein (1971) has argued that class-characteristic differences in the use of what he called elaborated and restricted codes within a single language community relate to facility with certain types of thought. Both of these approaches deal primarily with the appropriation for cognitive ends of linguistic structures associated with the referential function of language. In such cases, the various effects of language structure on habitual thought are either simply amplified by more intensive application or ideologically reshaped via purification and elaboration to achieve certain cultural goals more effectively. Such discursive practices simultaneously embody and sustain cultural goals, hence the dual relevance of ethnographic description and interactive analysis in examining them.

Nonreferential functions of language (e.g. social, expressive, aesthetic, etc.) have received much less attention. The focus on reference-and-predication makes some sense given that this appears to be the dominant function of language from a semiotic–structural point of view. However, there is no necessary reason why linkages between other functions of language and human thought could not also be investigated. Further, there may well be linkages to other aspects of individual functioning such as emotion, self-concept, etc. Although there are marked differences among languages in their pragmatic or expressive qualities, it is by no means obvious how to approach their study in a systematic way. Most existing research on language use or discourse consists of case studies with uncertain generalizability and, even when explicitly addressed to the relation of language and culture, remains heavily language-centered – lacking substantive analysis of broader psychological or social correlates. The balance of this section will be limited to indicating one possible approach to a comparatively grounded typology of functions and then providing examples of the sort of issues which might be explored.

4.2 Towards a new formulation

An overarching framework for characterizing these various forms of functional relativity and investigating their effects simply does not yet exist. By way of illustration of what such a framework might look like,

let us take with some modification Roman Jakobson's (1960) well-known typology of the semiotic functions of language. (For other uses and elaborations of Jakobson's scheme, see Hymes 1974 and Silverstein 1985a.)

Jakobson's typology is anchored in the components of the speech situation. He describes three functions which will be regarded here as primary. The first, and central, function of language is the *referential* or *cognitive* function which has to do with referring to and/or predicating about something in the context. Centered on the third-person pronominal forms, it receives formal recognition in the indicative mood. Diversity in the referential function lies at the center of traditional concerns about linguistic relativity. The referential function deals with the general context, hence variability in this sphere corresponds to a potential variability in the construal of reality. The traditional question of linguistic relativity, viewed in this fashion, has to do with the relation of the structure of the referential function to speakers' conceptions of reality.

The other two primary functions have to do with the nonreferential or, to use Sapir's ([1933] 1949b) term, expressive functions of language. First, the *emotive* function focuses on language's capacity to index speakers' attitudes and feelings towards what is spoken about. Centered on the first-person pronouns, it receives formal recognition in interjections and the conditional mood. Second, the *conative* function has to do with language's capacity to affect addressees and get them to act. Centered on the second-person pronominal forms, it receives formal recognition in vocatives and the imperative mood. Anthropological linguists have long been concerned with the differing pragmatic or expressive values of language forms, but with the exception of Hymes's work mentioned above and my own work (Lucy 1989), they have rarely formulated the concern in terms of a possible relativity.

Jakobson cites two further functions both of which are *reflexive* in that they refer to or index language form and use itself. The first is the *metalingual* function which corresponds to forms which communicate about the code structure of language (e.g. in glossing): it uses a language-internal sequence to build an equation. We can easily imagine a different metalingual apparatus and consequent differences in the understandings and control over language. In recent years, the implications of relativity of this sort for thought have been of central concern to some anthropological linguists, most notably Michael Silverstein (1979, 1981; cf. Lucy 1993) and others interested in linguistic ideology (e.g. Hill 1985 and Rumsey 1990).

The second reflexive function is the *poetic* function which corresponds to forms which communicate about the message form itself: it uses an equation (parallelism) to build a sequence. Here there is a long history of

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concern about the different sensibility implicated in different languages in their poetic forms. More broadly, the poetic function of language is implicated in all language use in the regular structuring of meanings into utterances and texts. These, of course, differ substantially across languages. Several anthropological linguists, notably Paul Friedrich (1986), have argued for some years now that the significant locus of relativity is in the poetic or aesthetic realm – that is, when discourse foregrounds this function (see also Sherzer 1987b, 1990; Urban 1991; Caton 1990).

This semiotic typology needs further refinement and formal grounding. It must also be brought into correspondence with other typologies of language function which focus on the psychological or social functionality of language (e.g. that of Michael Halliday 1973, 1978) and with a consideration of the functional impact of different mediational means (e.g. writing, see Goody & Watt 1968, Cole & Scribner 1981). It may eventually be possible to encompass within a unified theory the significant effects that arise from the variable forms of these other functions of language on analogy with the referential function (see Silverstein 1979).

4.3 Empirical research on functional differences

In the present context, it will only be possible to provide examples of how languages do vary discursively in ways that are relevant for both the psychological functioning of individual speakers and cultural interactions more broadly. One example each will be given for referential uses, expressive uses, and, in the context of a discussion of the interaction of linguistic structure and discursive function, reflexive uses.

4.3.1 Referential uses of language

Let us turn first to differences in the referential uses of language. Lev Vygotsky (1978, 1987; see also Lucy 1988, 1989; Lucy & Wertsch 1987) provides analysis of one type of variation in the use of language, that which arises from formal schooling. By school age, children have developed an array of conceptual representations which approximate adult forms in their outward aspect. Yet outward appearances can be misleading and Vygotsky claims that children of this age still lack true or "scientific" concepts, that is, *concepts which are subject to conscious awareness, are under voluntary control, and form part of an organized system*. In a sense, to develop further children now have to engage in a highly reflexive activity, namely, bringing the process of conceptualization itself under voluntary conceptual control. This involves placing their spontaneous concepts into a hierarchical system of relationships with other concepts.

However, from his studies of the cognitive abilities of Russian peasants, Vygotsky had come to believe that true scientific concepts did not develop of their own accord but only under the influence of formal schooling – that is, within a specific institutional structure. Scientific concepts are acquired ready-made in the school context as children learn them by *explicit verbal definition and use, that is, within a context of conscious voluntary manipulation of the linguistic code structure.*

Once encountered, scientific concepts begin to interact with the children's own spontaneous concepts. Spontaneous concepts provide the concrete materials with which to enter into and comprehend the more abstract discourse of schooling; the scientific concepts encountered in the school context provide the framework for organizing and bringing under conscious voluntary control the child's existing spontaneous concepts. Scientific concepts grow downward to find concrete content; spontaneous concepts grow upward to find abstract, systematic form. The interaction between spontaneous and scientific concepts generates the final phase of development wherein children gain conscious control over their own concepts and thinking. Thus, this final phase of development depends for its emergence on the specific verbal practices associated with formal schooling. In essence, a new functional demand from the social arena promotes a major structural reorganization of individual thought. This development depends on the socially and historically specific practices associated with schooling. Schooled children become aware that word meanings relate to one another as elements of structured systems and derive a portion of their meaning from their place in such systems. Once cognizant of this aspect of language, children can exploit more of the latent power of language as an instrument of thought (cf. Sapir [1921] 1949c).

Others have made proposals similar to Vygotsky's and over the last two decades it has become increasingly common to view schooling as inculcating specialized uses of language. However, little of this research has explored exactly which language practices affect cognition. This is of tremendous importance because what is called schooling need not be the same everywhere and some practices other than formal schooling may have similar effects. Available cross-cultural research comparing a range of schooled and unschooled populations by Michael Cole and others (Sharp, Cole, & Lave 1979; Scribner & Cole 1973; see Rogoff 1981) suggests that many of the effects of schooling derive from specific training in certain skills such as the use of two-dimensional representations, the organization and memory of disconnected information, and intensified use of the decontextual and reflexive qualities of natural language. The various sorts of institutions called "schools" may embody these characteristics to a greater or lesser degree (see the work of Stigler &

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This work on schooling converges with various lines of research in anthropology, psychology, sociology, and education which have attempted to articulate the implications of characteristic patterns of language use in certain class or ethnic groups for their school performance (Labov 1975, Bernstein 1971, Heath 1983, Hymes 1980, Bourdieu 1984), the significance of various forms of literacy for patterns of thought (Goody & Watt 1968, Greenfield 1972, Goody 1977, Olson 1977, Cole & Scribner 1981, Street 1984, Cook-Gumperz 1986), and the importance of language socialization practices for the inculcation of cultural world-view (Ochs & Schieffelin 1984; Schieffelin & Ochs 1986a, b; Ochs 1988; Miller 1986; Miller & Sperry 1987,1989). The latter body of research is especially important because it reveals vividly the cultural and subcultural diversity of language practices. Unfortunately, very little of this research actually attempts to demonstrate cognitive effects. Among the aspects of language use which vary and which might be relevant to cognition are semi-formalized patterns of presentation and dispute, training children to recite long texts, prompting a child what to say, expanding children's utterances, using leading questions, announcing activities/events for a child, verbal teasing and joking, and using a simplified lexicon and grammar. For example, routine challenges to arguments might be internalized by the child and used to examine his or her own thought; teasing might promote reflexive awareness of the problematic relation of language and reality. In both these cases everyday practice may promote the sort of voluntary, reflexive attention to language categories that Vygotsky argued was central in schooled discourse.

4.3.2 Expressive uses of language

Variability in the structures of the expressive function of language have also been studied but again not with an eye towards their constitutive role in individual functioning. One particularly vivid example is provided by Michelle Rosaldo's (1973) discussion of the public oratory of the Ilongot, a people of the Philippines. Ilongot oratory is used in public meetings by opposed parties who must find their way towards an agreement without the aid of a judge or arbitrator. The highly public nature of these speech events compels speakers to appeal somewhat more explicitly to social norms and ideals of order than would be common in private disputes in an attempt to find truth or establish the right course of action when these are far from clear. The oratory makes extensive use of a culturally recognized mode of speech which Rosaldo translates as 'crooked speech.' Crooked speech allows a man to hide behind his words or distance himself from them; it achieves indirection and disguise of intent.

Aesthetically, the speech is felt to be artful, witty, and charming. Formally, it is characterized by iambic stresses, phonological elaboration, metaphor, repetition, and puns. It contrasts with 'straight' speech which is used for everyday life.

Rosaldo then discusses how this mode of oratory is disrupted by the encounter with alternative ideals drawn from the wider Philippine sphere, a sphere now heavily influenced by speech norms of the West. Some speakers now adopt 'straight speech' as their ideal for oratory. This straight speech involves a more active body posture, appeals to external authorities, disparagement of indirection, imposition of new forms of organization on the interaction, and substitution of new metaphors. Although it might seem that these are just substitutes of new oratorical conventions for old, Rosaldo argues that there is an important difference.

> ... the idea of 'crooked' language is not, for traditional Ilongots, one of deviousness or deception; rather it seems to be linked to the feeling that men are equal, individual, and difficult to understand ... there is no simple path to truth, justice, or understanding;
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> ... linguistic elaboration, and a reflective interest in rhetoric, belongs to societies in which no one can command another's interest or attention, let alone enforce his compliance. In such societies, rhetoric may be a kind of 'courtship' ..., or it may, as in the Ilongot case, be an acknowledgement of the real differences among individuals and the elusiveness of human truth. The contrasting attitude, which prefers a plain and simple style, will be associated with any social order which recognizes an ultimate and knowable authority – be it god, or science, or the army.

It remains to be seen whether Rosaldo's suspicions about the linkage of complex, indirect rhetoric with an egalitarian ethos tolerant of difference (versus simple, direct speech with an authoritarian ethos not so tolerant) will appear in other societies and whether it will generalize to non-linguistic beliefs and behaviors. What is crucial here is that the proposed linguistic effect has little to do with direct referential content – it is not that the Ilongots have lexico-grammatical forms specifically referring to an egalitarian self. Rather, the effect is due to an implicit ethos embodied in the very way language is used – Ilongots use a variety of lexico-grammatical resources in a way that implies (or presupposes) an egalitarian view of others. In short, the expressive values of speech are rather consciously deployed in a way that both reflects and constitutes a certain attitude towards social reality. Indeed, conscious valuation of the style implicates a reflexive poetic evaluation that must also be grasped in any treatment of psychological effects.

It is worth emphasizing that this Ilongot example is by no means exhaustive of the range of possibilities. We know that the opportunities for expression in language vary in many ways. We can mention, by way of further example, pronoun systems which indicate differing relationships

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alternates of the *tu/vous* type: Brown & Gilman 1960), systematic cultural
shaping of expressive differences between men's and women's speech
([Ochs] Keenan 1974, Sherzer 1987a), subtlety of modes of indirection in
making requests (Ervin-Tripp 1976), and different verbal norms for the
expression of emotions (e.g. anger: Miller & Sperry 1987). In short, the
rich product of the ethnographic study of language has yet to be brought
seriously to play in direct consideration of the relativity of experience
associated with the diversity of functions and uses of language.

5 Ideology and the dialectic of linguistic structure and discursive function

In the specific examples just given, we did not need to make reference to
particular lexical or grammatical structures of the languages involved;
and it may well be that there are many usage effects which arise
independently of (or across) particular linguistic structures. More
generally, of course, language structure and discourse functionality do
not exist in isolation from one another, and the two may interact in
important ways. Discourse patterns can influence the impact of structural
patterns by altering the frequency of use of certain forms or by
channeling them in certain directions. In time, the systematic use of a
given form in one context will alter its structural value in the language
generally. A given context of use can even give rise, via emphasis on a
specific semiotic function, to a specific structural element. Inversely,
certain structural facts may facilitate the emergence of particular uses of
language, or come to shape the discourses dependent on them, in
characteristic ways. We have virtually no empirical research addressing
this issue, but theory and research will eventually have to deal directly
with the interplay between specific cognitive and cultural uses of language
and particular structural–functional configurations (cf. Lucy & Wertsch
1987, Lucy 1989, Bloom 1981).

Typically, such interactions of structure and function are mediated by
certain ideologies of language which reflexively structure discursive
practice (Silverstein 1979, 1985b). These ideologies add another
dimension to the interaction of structure and use as speakers bring
their reflective understanding of language to bear on intensionalizing and
regimenting their practice and as these reflections are themselves
influenced by the matrix language. Working out the details of such
interactions of structure, function, and ideology remains an enormous
untackled problem. One example, one with purported intellectual
consequences, will have to serve here to illustrate the complex issues
involved as particular language structures, social patterns of language
use, and ideologies of language converge historically to produce a

characteristic culture of language. (For other case studies, see Silverstein 1985b and Banfield 1978.)

An example of ideologically mediated structural-functional interplay in the referential domain appears in the intellectualization or rationalization of the standard language (i.e., the language of public life and the workplace) in the West as analyzed by Bohuslav Havránek ([1932] 1964). The functional goal of intellectualization of language forms is to make possible precise, rigorous, and, if necessary, abstract statements capable of expressing a certain complexity of thought. Such language forms may be required for legal, bureaucratic, or technical purposes and reach their fullest elaboration as a functional type in scientific discourse wherein lexical items approximate concepts and sentences approximate logical judgments. In such a case, we must recognize that the decision to use language as an aid to thought and action in this way is itself a cultural achievement and not something to be taken as given. Although the primary rationale for such forms of speech lies in the practical need for standardization in a large and complex social formation, an important secondary rationale lies precisely in the perceived advantages of such speech forms in supporting more precise, "accurate" thinking.

The intellectualization of the standard language manifests itself in the lexicon not only by a simple expansion of the vocabulary but also by changes in the structural relations among words. In order to provide unequivocal words, special distinctions, and abstract summarizing terms, new words must be created or old words adapted – words to express relationships such as existence, possibility, necessity, relations of causality, finality, parallelism, and the like (e.g. *unsubstantiated*). This entails a specialization of word formative patterns to express abstracted concrete events by a variety of forms such as substance of quality, verbal nouns, verbal adjectives, participial expressions, etc.

Intellectualization also affects the grammatical structure of the language. This is manifested in a preference for nominal groupings brought about by combining nouns with attributes or by nominal predication using empty verbs, a preference for the normalized sentence with clear formal differentiation of the subject and predicate, and a desire to achieve parallelism between the grammatical form and underlying logical structure – for instance by the expanded use of the passive voice. Finally, there is a preference for a tightly knit and integrated structure of sentences and compound sentences with an elaborate hierarchy of superordination and subordination expressing different relations of causality, finality, parallelism, and the like; this tendency also manifests itself in a certain specialization of conjunctions.

This intellectualized or rationalized language sacrifices everyday intelligibility for accuracy. General intelligibility and clarity cannot be

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the gauge of the accuracy of expression of a mathematical work or a legal document. Where everyday language achieves definiteness of reference by a combination of language conventions and appeal to situation, this rationalized language seeks to achieve a definiteness solely by use of an elaborate set of decontextualized conventional forms, that is, forms defined and codified so as to be generally valid rather than situationally contingent. Ultimately, speakers will require elaborate training or formal schooling in these conventions in order to be able to understand the code and use it to achieve the goals it was designed for. Socially disadvantaged speakers who lack the presupposed language skills, for example those from lower-class strata or minority language communities, may be closed out of certain occupational spheres. Indeed, socially advantaged speakers who control these language patterns may have privileged access to such spheres despite real deficiencies in qualifications in other respects.

Such an ideology can become widespread or even dominant in a culture generally by being valued and therefore analogically extended outside of the sphere(s) in which it first developed. This, again, is a cultural achievement and not necessary. Such a characteristic or dominant linguistic ideology will embody a culturally and historically specific world-view which may appear arbitrary, admirable, or foolish from the outside. Thus Bloom (1981) reports Chinese speakers' reluctance to accept or participate in the theoretical, context-independent mode of discourse characteristic of the West which they regard as amoral in some contexts. In a similar vein Carol Cohn (1987) has critically analyzed the dehumanizing implications of this intellectualized mode of discourse within nuclear strategic war-planning groups in the US and Pierre Bourdieu (1984) has made similar observations about the Western intellectual tradition generally. Bloom, Cohn, Bourdieu, and others have noted that although this mode of rationalized, decontextualized discourse achieves certain advantages in terms of scientific theory construction, it brings concomitant disadvantages insofar as it separates speakers from sensitivity to actual situations. Such an alienation from concrete realities can result in failed ethical engagement and moral action in the world. The crucial point in this, of course, is that this mode of orientation to the world is now richly embodied in the lexical and grammatical structure of the language itself – especially in the standard language of the dominant class strata. And as Whorf (1956b) noted long ago, speakers will, quite predictably, take the elements of their language as "natural" and "given" in the world. In a sense, then, we can say this linguistic ideology has been "naturalized" in our linguistic culture.

Finally, a given discursive practice which ideologically regiments language structure to certain ends can spread beyond the original linguistic and cultural milieu in which it developed. In the case of

Ilongot oratory discussed above, the Western ideology of language, with its discursive emphasis on the isomorphism of language form and thought, may come into conflict with another ideology and may come to displace it. In the case of Chinese use of counterfactuals, Bloom (1981) reports that certain existing grammatical forms have now been reinterpreted, others applied more systematically, and still others recruited to new functions to achieve "clarity" from the new point of view. What is telling in this latter case as one reads the contending points of view in the literature disputing or defending Bloom's results is that native Chinese speakers with different degrees of exposure to Western languages and discursive practices now disagree fundamentally about what the Chinese language is (or was) "really like."

In still more extreme cases, specific syntactic patterns associated with a given discursive norm can be imported into a distinct linguistic community and directly promulgated by an influential elite to produce a new structural–functional register. For example, in Thai, "syntactic reform" modeled on Sanskrit, Latin, and English aimed to produce a grammar which was more "logical" and capable of being precise and unambiguous regardless of context (Diller 1993: esp. pp. 396ff.). Verb conjugations and case markings were created out of periphrastic constructions, normative word order was defined along with an across-the-board passive, previously ubiquitous noun and pronoun deletion were discouraged (with important sociolinguistic consequences), new lexical items were added, new modes of address were established, etc. This elite register has since been promulgated through written grammars, the school system, and by elite usage as correct or proper Thai. The cognitive effects of such transformations for Thai speakers can only be guessed at without specific study, but the potential effects of discursive ideology on language structure should be clear. Ironically, one upshot of this wholesale ideological transformation of the grammar is that Western scholars can now "discover" that Thai (i.e., in its formalized "high" register) fits comfortably into the discursive and even structural patterns expected on the basis of research with the more familiar European languages.

These examples of Western formal schooling, Ilongot public oratory, and modern technical language involve focused manipulations of language for social, intellectual, aesthetic, or political ends and these manipulations each depend in turn on accepting a certain ideology of language at several degrees of generality. Yet such an ideology of language itself arises initially in a discourse which draws on the available language forms and usages in a powerful and intimate way. That is, our very understanding of language as a cultural phenomenon may draw in important ways on the structures and uses characteristic of our own language. Indeed, a number of observers have suggested that our formulation of the linguistic relativity

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problem itself bears the traces of our own linguistic structures and dominant ideological perspective on the nature of discursive interaction (Lucy 1985a, Rumsey 1990, Reddy 1979). It is this reflexive aspect of the linguistic relativity problem which makes it one of the more profoundly difficult and important methodological problems for all the human disciplines (Lucy 1993).

6 Summary

Natural language adds a dimension to human life not present in other species and may give rise to a semiotic relativity. The distinctive semiotic property of natural language is its symbolic component. Language retains the iconic and indexical properties characteristic of other signalling systems, but they are transformed by their conjunction with the symbolic aspect to create a communicative medium of extraordinary flexibility and diversity with implications for both the social objectification of thought and the emergence of reflective awareness. These are the aspects of natural language which will be most relevant to tracing its potential implications for thought, belief, and behavior.

The traditional linguistic relativity proposal is concerned with the implications for thought of the use of diverse natural languages. To date, despite the manifest importance of the problem, there has been very little empirical research at all, and not much of what exists has been adequately formulated. These problems stem from both disciplinary differences and broader cultural attitudes. Adequate investigation of the proposal must be comparative, deal with significant language structures and actual speakers, and come to grips with the problem of developing a comparative metalanguage. A few studies meeting these standards now exist.

More recent research on language use (or functioning) suggests the possibility of another form of relativity, a discursive relativity, centering on the cultural deployment of specialized speech modes. Although there is a growing body of research on language use, it has not been systematically evaluated in terms of its implications for thought. Such an evaluation would have to meet the same standards of adequacy already mentioned for structural relativity, but would, additionally, have to develop a typology of language functions within which a comparison could be made. Existing typologies suggest that research attention needs to be broadened beyond the traditional preoccupation with the referential capacity of language and its intellectual consequences to include an examination of the potential effects of diversity in the expressive uses of language on personal and social functioning. Some existing theory and research (e.g. on formal schooling and political oratory) can be profitably reinterpreted within this framework.

Finally, structural and functional factors may interact with one another. The existence of a certain structure of meaning may facilitate the emergence of certain specialized uses of language; a given discourse mode may amplify or channel existing structural meanings or create a new level of structural order. In such interactions, various ideologies of language may play a pivotal role in the essentialization and regimentation of both structure and use, and both language categories and cultural requirements for speaking may, in turn, shape the available linguistic ideologies. Finally, such ideologies may spread beyond their original cultural or subcultural niche to influence substantially different linguistic and discursive systems. These interactive problems have been little studied to date – at least with regard to their broader cultural and psychological consequences.

Because of the linguistic relativity he saw, Whorf placed the science of language at the center of all efforts to advance human understanding. However, from an empirical point of view, we have done little in the last half century to expand on his insights. However, when we join his work with a fuller semiotic analysis, with more recent research on the discursive (or functional) diversity among languages, and with a consideration of the role of linguistic ideologies in shaping their interaction, we can articulate more clearly the scope and complexity of the problem he identified. An adequate understanding of the dynamic interaction between language, culture, and self will depend on exploring the full scope of linguistic relativity.

Acknowledgments

References

Aarsleff, H. 1982. *From Locke to Saussure: essays on the study of language and intellectual history*. Minneapolis: University of Minnesota Press.

Au, T. 1983. Chinese and English counterfactuals: the Sapir–Whorf hypothesis revisited. *Cognition*, 15, 155–87.

Banfield, A. 1978. Where epistemology, style, and grammar meet literary history: the development of represented speech and thought. *New Literary History*, 9, 415–54.

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New Literary History, 9,

Benveniste, E. 1971 [19391. The nature of the linguistic sign. In Benveniste, *Problems in general linguistics*. Tr. M. Meek (pp. 43–8). Coral Gables, FL: University of Miami.

Berlin, B. & Kay, P. 1969. *Basic color terms: their universality and evolution*. Berkeley: University of California Press.

Bernstein, B. 1971. *Class, codes and control*, vol. I: Theoretical studies toward a sociology of language. London: Routledge & Kegan Paul.

Bloom, A. 1981. *The linguistic shaping of thought: a study in the impact of language on thinking in China and the West*. Hillsdale, NJ: Lawrence Erlbaum.

Boas, F. 1966 [1911]. Introduction. In F. Boas (ed.), *Handbook of American Indian languages* (reprint ed. P. Holder) (pp. l–79). Lincoln: University of Nebraska Press.

Bourdieu, P. 1984 [1979]. *Distinction: a social critique of the judgement of taste*. Tr. R. Nice. Cambridge, MA: Harvard University Press.

Brown, R. & Gilman, A. (1960). The pronouns of power and solidarity. In T. Sebeok (ed.), *Style in language* (pp. 253–76). Cambridge, MA: MIT Press.

Brown, R. & Lenneberg, E. 1954. A study in language and cognition. *Journal of Abnormal and Social Psychology*, 49, 454–62.

Carroll, J. & Casagrande, J. 1958. The function of language classifications in behavior. In E. Maccoby, T. Newcomb, & E. Hartley (eds.), *Readings in social psychology* (pp. 18–31). New York: Henry Holt.

Caton, S. 1990. *"Peaks of Yemen I summon." Poetry as cultural practice in a North Yemeni tribe*. Berkeley: University of California Press.

Chomsky, N. 1972. *Language and mind* (enlarged edn.). New York: Harcourt, Brace, Jovanovich.

Cohn, C. 1987. Sex and death in the rational world of defense intellectuals. *Signs*, 12, 687–718.

Cole, M. & Scribner, S. 1981. *The psychology of literacy*. Cambridge, MA: Harvard University Press.

Conklin, H. 1955. Hanunóo color categories. *Southwest Journal of Anthropology*, 11, 339–44.

Cook-Gumperz, J. (ed.) 1986. *The social construction of literacy*. Cambridge University Press.

Diller, A. 1993. Diglossic grammaticality in Thai. In W. Foley (ed.), *The role of theory in language description* (pp. 393–420). Berlin: Mouton de Gruyter.

Ervin-Tripp, S. 1976. Is Sybil there? The structure of American English directives. *Language in Society*, 5, 25–66.

Fishman, J. 1982. Whorfianism of the third kind: ethnolinguistic diversity as a worldwide societal asset. (The Whorfian hypothesis: varieties of validation, confirmation, and disconfirmation II). *Language in Society*, 11, 1–14.

Friedrich, P. 1986. *The language parallax: linguistic relativism and poetic indeterminacy*. Austin: University of Texas Press.

Goody, J. 1977. *The domestication of the savage mind*. Cambridge University Press.

Goody, J. & Watt, I. 1968. The consequences of literacy. In J. Goody (ed.), *Literacy in traditional societies* (pp. 27–68). Cambridge University Press.

Greenfield, P. 1972. Oral or written language: the consequences for cognitive development in Africa, the United States, and England. *Language and Speech*, 15, 169–78.

Gumperz, J. J. 1982. *Discourse strategies*. Cambridge University Press.

Gumperz, J. J. & Hymes, D. (eds.) 1972. *Directions in sociolinguistics: the ethnography of communication*. New York: Holt, Rinehart, & Winston.

Halliday, M. 1973. *Explorations in the functions of language*. New York: Elsevier.
1978. *Language as social semiotic: the social interpretation of language and meaning*. Baltimore: University Park.

Havránek, B. 1964 [1932]. The functional differentiation of the standard language. In P. Garvin (ed. and tr.), *A Prague School reader on esthetics, literary structure, and style* (pp. 3–16). Washington, DC: Georgetown University Press.

Heath, S. 1983. *Ways with words: language, life, and work in communities and classrooms*. Cambridge University Press.

Heider, E. 1972. Universals in color naming and memory. *Journal of Experimental Psychology*, 93, 10–20.

Hill, J. 1985. The grammar of consciousness and the consciousness of grammar. *American Ethnologist*, 12, 725–37.

Hockett, C. 1958. *A course in modern linguistics*. New York: Macmillan.

Hoijer, H. 1953. The relation of language to culture. In A. L. Kroeber (ed.), *Anthropology today* (pp. 554–73). University of Chicago Press.

Hymes, D. 1961. On typology of cognitive styles in language (with examples from Chinookan). *Anthropological Linguistics*, 3, 22–54.
1966. Two types of linguistic relativity (with examples from Amerindian ethnography). In W. Bright (ed.), *Sociolinguistics, Proceedings of the UCLA sociolinguistics conference, 1964* (pp. 114–67). The Hague: Mouton.
1974. *Foundations in sociolinguistics: an ethnographic approach*. Philadelphia: University of Pennsylvania Press.
1980. Speech and language: on the origins and foundations of inequality among speakers. In Hymes, *Language and education: essays in educational ethnolinguistics* (pp. 19–61). Washington, DC: Center for Applied Linguistics.

Imai, M. & Gentner, D. 1993. Linguistic relativity vs. universal ontology: cross-linguistic studies of the object/substance distinction. Paper presented to the Twenty-ninth Meeting of the Chicago Linguistic Society.

Inhelder, B. & Piaget, J. 1958. *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.

Kay, P. & McDaniel, C. K. 1978. The linguistic significance of the meanings of Basic Color Terms. *Language*, 54, 610–46.

Jakobson, R. 1960. Concluding statement: linguistics and poetics. In T. A. Sebeok (ed.), *Style in language* (pp. 350–77). Cambridge, MA: MIT Press.

Labov, W. 1975. Academic ignorance and black intelligence. In M. Maehr & W. Stallings (eds.), *Culture, child, and school: sociocultural influences on learning* (pp. 63–81). Monterey, CA: Brooks/Cole.

Lenneberg, E. & Roberts, J. 1956. The language of experience: a study in methodology. *International Journal of American Indian Linguistics*, 22 (2, part 2, memoir 13).

Liu, L. 1985. Reasoning counterfactually in Chinese: are there any obstacles? *Cognition*, 21, 239–70.

Lucy, J. 1985a. The historical relativity of the linguistic relativity hypothesis. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 7, 103–8
1985b. Whorf's view of the linguistic mediation of thought. In E. Mertz & R. Parmentier (eds.), *Semiotic mediation: sociocultural and psychological perspectives* (pp. 73–97). New York: Academic Press.

1988. The role of the views of *Comparati*
1989. *Vygotsky* Meeting of City, MO.
1992a. *Gramma relativity hyp*
1992b. *Language hypothesis*. Ca
1993. Reflexive l *language: rep* University Pre
in press. The lin *categories in tl*

Lucy, J. & Shwede influences on c
1988. The effect *American Anth*

Lucy, J. & Wertsch. Hickmann (ed. (pp. 67–86). Ca

Lyons, J. 1977. *Sem*

Mahnowski, B. 192 Ogden & I. Ri York: Harcourt

Malotki, E. 1983. *H Hopi language.*

Mathiot, M. 1964. I (ed.), *Language* (pp. 154–61). N

Miller, P. 1986. Tea working-class c *socialization acr*

Miller, P. & Sperry, *Palmer Quarterl*
1989. Early talk ab experience. *Journ*

Newman, S. 1954. S search for meth University of Chi

Ochs E. 1988. *Cultu language socializa*

[Ochs] Keenan, E. 19 and women in a *Explorations in* University Press.

Ochs, E. & Schieffelin developmental sto (eds.), *Culture th* Cambridge Univer

s *in sociolinguistics: the*
inehart, & Winston.
age. New York: Elsevier.
retation of language and

iation of the standard
hool reader on esthetics,
gton, DC: Georgetown

vork in communities and

l memory. *Journal of*

sciousness of grammar.

ork: Macmillan.
In A. L. Kroeber (ed.),
cago Press.
age (with examples from

ples from Amerindian
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lague: Mouton.
approach. Philadelphia:

ons of inequality among
essays in educational
for Applied Linguistics.
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Paper presented to the
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nking from childhood to

ince of the meanings of

poetics. In T. A. Sebeok
A: MIT Press.
ice. In M. Maehr & W.
al influences on learning

experience: a study in
Indian Linguistics, 22

re there any obstacles?

c relativity hypothesis.
ve Human Cognition, 7,

ight. In E. Mertz & R.
ral and psychological

1988. The role of language in the development of representation: a comparison of the views of Piaget and Vygotsky. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 10(4), 99–103.

1989. *Vygotsky and the culture of language.* Paper read at the Biennial Meeting of the Society for Research in Child Development, Kansas City, MO.

1992a. *Grammatical categories and cognition: a case study of the linguistic relativity hypothesis.* Cambridge University Press.

1992b. *Language diversity and thought: a reformulation of the linguistic relativity hypothesis.* Cambridge University Press.

1993. Reflexive language and the human disciplines. In J. Lucy (ed.), *Reflexive language: reported speech and metapragmatics* (pp. 1–32). Cambridge University Press.

in press. The linguistics of "color." In C.L. Hardin & L. Maffi (eds.), *Color categories in thought and language.* Cambridge University Press.

Lucy, J. & Shweder, R. 1979. Whorf and his critics: linguistic and nonlinguistic influences on color memory. *American Anthropologist*, 81, 581–615.

1988. The effect of incidental conversation on memory for focal colors. *American Anthropologist*, 90, 923–31.

Lucy, J. & Wertsch, J. 1987. Vygotsky and Whorf: a comparative analysis. In M. Hickmann (ed.), *Social and functional approaches to language and thought* (pp. 67–86). Cambridge University Press.

Lyons, J. 1977. *Semantics.* 2 vols. Cambridge University Press.

Mahnowski, B. 1923. The problem of meaning in primitive languages. In C. Ogden & I. Richards (eds.), *The meaning of meaning* (pp. 296–336). New York: Harcourt, Brace, & World.

Malotki, E. 1983. *Hopi time: a linguistic analysis of the temporal categories in the Hopi language.* Berlin: Mouton.

Mathiot, M. 1964. Noun classes and folk taxonomy in Papago. In D. Hymes (ed.), *Language in culture and society: a reader in linguistics and anthropology* (pp. 154–61). New York: Harper & Row.

Miller, P. 1986. Teasing as language socialization and verbal play in a white, working-class community. In B. Schieffelin & E. Ochs (eds.), *Language socialization across cultures* (pp. 199–212). Cambridge University Press.

Miller, P. & Sperry, L. 1987. The socialization of anger and aggression. *Merrill Palmer Quarterly*, 33, 1–31.

1989. Early talk about the past: the origins of conversational stories of personal experience. *Journal of Child Language*, 15, 293–315.

Newman, S. 1954. Semantic problems in grammatical systems and lexemes: a search for method. In H. Hoijer (ed.), *Language in culture* (pp. 82–91). University of Chicago Press.

Ochs E. 1988. *Culture and language development: language acquisition and language socialization in a Samoan village.* Cambridge University Press.

[Ochs] Keenan, E. 1974. Norm-makers, norm-breakers: uses of speech by men and women in a Malagasy community. In R. Bauman & J. Sherzer (eds.), *Explorations in the ethnography of speaking* (pp. 125–43). Cambridge University Press.

Ochs, E. & Schieffelin, B. 1984. Language acquisition and socialization: three developmental stories and their implications. In R. Shweder & R. LeVine (eds.), *Culture theory: essays on mind, self, and emotion* (pp. 276–320). Cambridge University Press.

Olson, D. 1977. From utterance to text: the bias of language in speech and writing. *Harvard Educational Review*, 47, 257–81.

Peirce, C. S. 1932. *Collected papers of C. S. Peirce*, vol. II. Cambridge, MA: Harvard University Press.

Piaget, J. 1967 [1954]. Language and thought from the genetic point of view. In J. Piaget, *Six psychological studies*, ed. D. Elkind. Tr. A. Tenzer (pp. 88–99). New York: Random House.

1973. *Main trends in inter-disciplinary research*. New York: Harper & Row.

Reddy, M. 1979. The conduit metaphor: a case of frame conflict in our language about language. In A. Ortony (ed.), *Metaphor and thought* (pp. 284–324). Cambridge University Press.

Rogoff, B. 1981. Schooling and the development of cognitive skills. In H. Triandis & A. Heron (eds.), *Handbook of cross-cultural psychology*, vol. IV (pp. 233–94). Rockleigh, NJ: Allyn & Bacon.

Rosaldo, M. 1973. I have nothing to hide: the language of Ilongot oratory. *Language in Society*, 2, 193–223.

Rumsey, A. 1990. Wording, meaning, and linguistic ideology. *American Anthropologist*, 92, 346–61.

Sapir, E. 1949a [1924]. The grammarian and his language. In *The selected writings of Edward Sapir in language, culture, and personality*, ed. D. G. Mandelbaum (pp. 150–9). Berkeley: University of California Press.

1949b [1933]. Language. In *The selected writings of Edward Sapir in language, culture, and personality*, ed. D. G. Mandelbaum (pp. 7–32). Berkeley: University of California Press.

1949c [1921]. *Language: an introduction to the study of speech*. New York: Harcourt, Brace, & Company.

1949d [1929]. The status of linguistics as a science. In *The selected writings of Edward Sapir in language, culture, and personality*, ed. D. G. Mandelbaum (pp. 160–6). Berkeley: University of California Press.

1964 [1931]. Conceptual categories in primitive languages. In D. Hymes (ed.), *Language in culture and society: a reader in linguistics and anthropology* (p. 128). New York: Harper & Row.

Schieffelin, B. & Ochs, E. 1986a. Language socialization. *Annual Review of Anthropology*, 15, 163–246.

(eds.) 1986b. *Language socialization across cultures*. Cambridge University Press.

Scribner, S. & Cole, M. 1973. Cognitive consequences of formal and informal education. *Science*, 182, 553–9.

Sharp, D., Cole, M. & Lave, C. 1979. Education and cognitive development: the evidence from experimental research. *Monographs of the Society for Research in Child Development*, 44 (1–2, serial no. 178).

Sherzer, J. 1987a. A diversity of voices: men's and women's speech in ethnographic perspective. In S. Philips, S. Steele, & C. Tanz (eds.), *Language, culture, gender, and sex in comparative perspective* (pp. 95–120). New York: Cambridge University Press.

1987b. A discourse-centered approach to language and culture. *American Anthropologist*, 89, 295–309.

1990. *Verbal art in San Blas, Kuna culture through its discourse*. Cambridge University Press.

Silverstein, M. 1979. Language structure and linguistic ideology. In P. Clyne, W. Hanks, & C. Hofbauer (eds.), *The elements: a parasession on linguistic units and levels* (pp. 193–247). Chicago Linguistic Society.

f language in speech and

vol. II. Cambridge, MA:

e genetic point of view. In
Tr. A. Tenzer (pp. 88–99).

York: Harper & Row.
ie conflict in our language
ind thought (pp. 284–324).

tive skills. In H. Triandis &
logy, vol. IV (pp. 233–94).

:uage of Ilongot oratory.

istic ideology. *American*

;e. In *The selected writings*
y, ed. D. G. Mandelbaum
:ss.
Edward Sapir in language,
im (pp. 7–32). Berkeley:

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n *The selected writings of*
, ed. D. G. Mandelbaum
ss.
.ages. In D. Hymes (ed.),
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ttion. *Annual Review of*

nbridge University Press.
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gnitive development: the
f the Society for Research

id women's speech in
:le, & C. Tanz (eds.),
perspective (pp. 95–120).

and culture. *American*

ts *discourse*. Cambridge

leology. In P. Clyne, W.
ession on linguistic units

1981. The limits of awareness. *Sociolinguistics Working Paper No. 84*. Austin, TX: Southwestern Educational Laboratory.

1985a. The culture of language in Chinookan narrative texts; or, On saying that ... in Chinook. In J. Nichols & A. Woodbury (eds.), *Grammar inside and outside the clause: some approaches to theory from the field* (pp. 132–71). Cambridge University Press.

1985b. Language and the culture of gender: at the intersection of structure, usage, and ideology. In E. Mertz & R. Parmentier (eds.), *Semiotic mediation: sociocultural and psychological perspectives* (pp. 219–59). Orlando, FL: Academic Press.

Steffire, V., Morley, L. & Castillo Vales, V. 1966. Language and cognition in Yucatan: a cross-cultural replication. *Journal of Personality and Social Psychology*, 4, 112–15.

Stigler, J. & Perry, M. 1988. Mathematics learning in Japanese, Chinese, and American classrooms. In G. Saxe & M. Gearhart (eds.), *Children's mathematics* (pp. 27–54). San Francisco: Jossey-Bass.

Street, B. 1984. *Literacy in theory and practice*. Cambridge University Press.

Urban, G. 1991. *A discourse-centered approach to culture: native South American myths and rituals*. Austin: University of Texas Press.

Vygotsky, L. S. 1978 [1930–4]. *Mind in society: the development of higher psychological processes*, ed. and tr. M. Cole, V. John-Steiner, S. Scribner, & E. Souberman. Cambridge, MA: Harvard University Press.

1987 [1934]. *Thought and language* (rev. edn. A. Kozulin). Cambridge, MA: MIT Press.

Witherspoon, G. 1977. *Language and art in the Navajo universe*. Ann Arbor: University of Michigan Press.

Whorf, B. 1956a [1939]. The relation of habitual thought and behavior to language. In *Language, thought, and reality: selected writings of Benjamin Lee Whorf*, ed. J. B. Carroll (pp. 134–59). Cambridge, MA: MIT Press.

1956b [1940]. Science and linguistics. In *Language, thought, and reality: selected writings of Benjamin Lee Whorf*, ed. J. B. Carroll (pp. 207–19). Cambridge, MA: MIT Press.