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# Introductory comments

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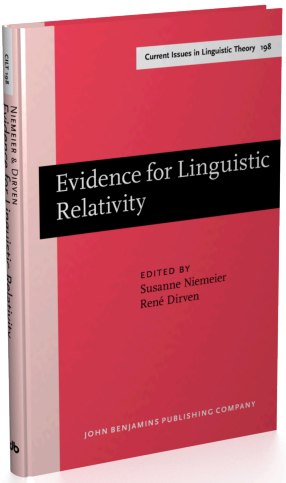


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# Introductory Comments

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Through most of the last century, the linguistic relativity hypothesis, the proposal that the particular language we speak influences the way we think about reality, has not been subject to a sustained program of empirical research in any of the concerned disciplines. As a result, the validity and proper scope of the proposal have remained largely in the realm of speculation.[1] However, over the past decade interest in the empirical assessment of the hypothesis has now emerged in several disciplines, and we have entered a period of considerable debate both about what is meant by linguistic relativity and what, in fact, would constitute adequate evidence for the various formulations (Lucy 1997a). The studies in this volume contribute a range of voices to this new empirical enterprise.

## 1. Characterizing linguistic relativity

The linguistic relativity proposal forms part of the general question of how language influences thought and can, therefore, be defined in contrast to closely related but analytically distinct questions. Potential influences of language on thought can be classed into three types or levels (Lucy 1996). The first, or semiotic, level concerns how speaking any natural language at all may influence thinking. The question is whether having a code with a symbolic component (versus one confined to iconic-indexical elements) transforms thinking in certain ways. If so, we can speak of a *semiotic relativity* of those aspects of thought with respect to other species lacking such a code. The second, or structural, level concerns how speaking one or more particular natural languages (e.g., Hopi versus English) may influence thinking. The question is whether quite different morphosyntactic configurations of meaning affect some aspects of thinking about reality. If so, we can speak of a

structural relativity of thought with respect to speakers using a different language. This has been the level traditionally associated with the term *linguistic relativity* and this usage will be employed here. The third, or functional, level concerns whether using language in a particular way (e.g., schooled, scientific) may influence thinking. The question is whether verbal discursive practices affect some aspects of thinking either by modulating structural influences or by directly influencing the interpretation of the interactional context. If so, we can speak of a functional relativity of thought with respect to speakers using language differently. This level has been of particular interest during the second half of the past century with the increasing interest in discourse-level analyses of language and can, therefore, also be conveniently referred to as *discursive relativity*. These three analytic levels are not entirely independent in practice and interact in important ways (Lucy 1997a). Most of the studies in this volume concern themselves with the linguistic relativity proper, that is, with structural effects, although a good number also invoke discourse-level regularities either as the site of structural effects or as an independent source of cultural differences.[2]

The various linguistic relativity proposals available in the literature can also be defined on internal grounds in that they all share three key elements linked in two relations. They all claim that certain properties of a given *language* have consequences for patterns of *thinking* about *reality*. The properties of language at issue are usually morphosyntactic (but may be phonological or pragmatic) and are taken to vary in important respects. The pattern of thinking may have to do with immediate perception and attention, with personal and social-cultural systems of classification, inference, and memory, or with aesthetic judgment and creativity. And the reality may be the world of everyday experience, of specialized contexts, or of ideational tradition. These three key elements are linked by two relations: (1) language embodies *an interpretation* of reality and (2) language can *influence* thought about that reality. The interpretation arises from the selection of substantive aspects of experience and their formal arrangement in the verbal code. Such selection and arrangement is, of course, necessary for language, so the crucial emphasis here is that each language involves a particular interpretation, not a common, universal one. An influence on thought ensues when the particular language interpretation guides or supports cognitive activity and hence the beliefs and behaviors dependent on it. Accounts vary in the specificity of the proposed mechanism of influence and in the degree of power attributed to it – the strongest version being a strict linguistic determinism (based, ultimately, on the identity of language and thought). A proposal of linguistic relativity thus claims that diverse linguistic interpretations of reality yield demonstrable influences on thought.

## 2. Empirical evaluations of linguistic relativity

Appraisal of the linguistic relativity proposal thus requires *both* articulating the contrasting interpretations of reality latent in different languages *and* assessing their broader influence on, or relationship to, the cognitive interpretation of reality (see Lucy 1992b). Judged by this standard of providing both a contrastive language assessment and an associated cognitive assessment with respect to some reality, very few existing studies are actually capable of demonstrating linguistic relativity. Instead, a variety of incomplete formulations are widely prevalent (Lucy 1997a). Two of these having to do with what I have called "lingua-centrism" (Lucy 1992a) will be especially important in the discussion below.

First, some researchers equate any linguistic diversity to linguistic relativity. But in itself a description of linguistic diversity does not establish any impact of language on thought about reality. Few doubt that languages differ – at least few of those who know languages other than their own. Where people disagree is in whether there are any broader cognitive or cultural effects of such differences with respect to the interpretation of reality. Without some demonstration of broader effect on the construal of reality, one does not have a case of linguistic relativity but only of linguistic diversity.

In recent years, Slobin (e.g., This volume) has emphasized the importance of "thinking for speaking," that is, that speaking diverse languages necessarily entails differences in online cognitive processing. This approach makes explicit the intuition behind the more widespread notion that linguistic diversity, especially in the semantic realm, necessarily entails, in itself, a kind of relativity in perspective on the world. But by the criteria proposed above, thinking for speaking does not in itself amount to linguistic relativity. (And if we *were* to opt to include thinking for speaking as a kind of linguistic relativity, then we would immediately have to coin a new term to cover the possible effects of language use on cognitive processes more generally.) Nonetheless, it is important to notice that every valid linguistic relativity proposal necessarily includes within it a claim about thinking for speaking. That is, all efforts to articulate the vision of reality latent in language use must work out the cognitive implications of using specific language forms in order to make the claim that those language-linked cognitive patterns have effects elsewhere. In short, a distinctive morphosyntactic pattern must realize a distinctive pattern of thinking for speaking if it is to have broader effects, but such a pattern of thinking for speaking is not, in itself, sufficient to establish what usually is meant by linguistic relativity.

Second, some researchers attempt to demonstrate such broader cognitive effects by using other data of a verbal character. Yet such evidence is largely

unconvincing because it conforms, by definition, to the same production rules of speech itself. That is, if the evidence for a cognitive effect of language consists of additional language production data, then one has only shown that one set of language practices generated using a certain set of linguistic structures parallels another set of language practices generated from essentially the same set of linguistic structures. Likewise, if the stimulus materials (representing "reality") for the cognitive task are verbal in nature, then one has, in fact, only assessed verbal comprehension, not an independent cognitive interpretation of reality. In short, evidence for linguistic relativity depends on there being an assessment of cognition and that assessment must itself be in some respect independent of immediate verbal production.

A number of the papers in this volume push hard at the distinction articulated here, mounting efforts to extract broad cognitive implications out of essentially verbal materials. The basic strategy is to show that certain verbal patterns productively shape verbal interpretation or behavior in new contexts. Such productive extensions suggest a cognitive orientation broader than might be suggested by a relatively mechanical deployment of grammatical rules. Although evidence of this type will persuade some, experience indicates it will not impress those who doubt there are broader effects of language on thinking. Hence, at present, such evidence can be supportive, but not decisive in evaluating linguistic relativity. Nonetheless, it is important to realize that this limitation is largely a rhetorical one, that is, about what is convincing at present rather than what is in fact the case. There are many domains of experience that are primarily or exclusively verbal and we might expect linguistic relativity to have its most dramatic effects in such domains. To assess relativity in such situations, we must, of necessity, employ verbal measures to show how thought is operating in these domains (Lucy 1992a). The sorts of measures developed in several of the papers here suggest how this might plausibly be accomplished. In short, although such evidence cannot be decisive at the present time, it is likely that, over the long run, insofar as there is linguistic relativity, such verbal measures will become critical elements in its assessment, supplementing other sorts of cognitive measures when available and substituting for them when not.

Finally, it is worth emphasizing that even when empirical studies meet the full set of criteria set out above, they can nonetheless differ substantially in their overall orientation. In general, empirical studies fall into three types depending on their preferred orientation to the research (Lucy 1997a). Structure-centered approaches begin with language differences and ask about their implications for thought. Domain-centered approaches begin with experienced reality and ask how different languages encode it. And behavior-centered approaches begin with some practical concern and seek an explana-

tion in language's effect on thought. Each of these approaches has certain advantages and disadvantages. Most of the papers in the current volume evidence a structure-centered approach with its characteristic attentiveness to language structure and tendency to slight rigorous independent cognitive assessment. Since such studies have been relatively rare in the literature, their appearance here is welcome. A few papers, however, represent domain- or behavior-centered approaches and provide useful contrasts on what can be achieved in these ways.

## 3. Evidence from language structure: Production, interpretation, and change

The first group of papers in this volume make little or no appeal to data beyond language itself. Instead they show in a variety of ways how the productivity and restrictiveness of diverse verbal categories can be assessed and, in some cases, brought directly or indirectly to bear on the linguistic relativity proposal. The first paper (Bohn) concerns phonological structure, the second two (Schroten; Maratsos, Katis, and Margheri) undertake multi-language semantic comparison with attention to collocational and other grammatical contexts, and the final two (Györi, Rhodes) involve exploiting historical changes in lexical value to understand and evaluate semantic processes.

Bohn provides an excellent overview of work in the area of speech perception showing that it is heavily influenced by specific language experience during the first year of life. Thereafter perception remains fairly open to new classifications during childhood (apparently until about seven years of age) and then falls of, though some measure of flexibility continues even in adulthood. In his formulation, such differences in speech perception themselves amount to linguistic relativity.[3] Certainly the linguistic differences are powerful and, indeed, have long served as a sort of exemplar of the channeling force of linguistic form (Sapir 1949a, b, Whorf 1956b). However, as Bohn himself makes clear, the effects are largely confined to the perception of speech sounds in language, even to the extent that the hemispheric localization of the processing actually differs for speech and nonspeech sounds. What we have is a task-specific shaping of attentional processes rather than any general reshaping of sensory capacity. In short, there is no evidence of any general relativity of acoustic processing or acoustic reality beyond language processing. What we do have however is an elegant line of research showing how powerful language differences emerge in childhood and affect our habitual ability to hear other languages. We should expect no less pow-

erful differences to emerge at other levels of language, giving us, for example, a "semantic" accent when we encounter other languages. Alas, a number of prominent claims about linguistic universals seem to depend on just such a "discovery" of our own semantic categories in other languages (Lucy 1997b). But it remains to be seen whether our semantic accent also remains confined to language processing to the same degree. Such confinement seems less likely since semantic forms, in contrast to phonological ones, have more than simply system-internal "value," but, ultimately, any effects will also depend on the degree to which such semantic patterns are recruited for other cognitive uses.

Schroten undertakes a domain-centered semantic comparison of body part expressions[4] in English, Spanish, and Dutch. Using Pustejovsky's (1995) notion of "qualia," he characterizes the differences in lexical semantics underlying the different phrasal collocations permitted by each language.[5] By doing so, he is able to render as part of the lexical semantics of body part terms aspects of meaning that others have characterized as cognitive or conceptual. Although one may have reservations about the typological justification of the various qualia and some of the specific lexical analyses, the general conclusion that the various body part terms have very different semantics in the three languages is persuasive. By taking seriously collocational meanings, the study transcends the usual domain-centered approach and moves toward an analysis of structural contributions to meaning. In this respect, his study fits with the general tendency, evident in the best recent comparative work, to productively integrate domain-and structure-based approaches and their respective advantages in comparative efficiency and linguistic validity (Lucy 1997a). What remains to be done in achieving a true structure-based analysis, however, is, first, to move beyond a list of individual lexical cases to an integrated statement about the common or unifying semantic organization of each language and then, second, and crucially, to articulate the effects of such differences in semantic organization on cognitive activity more generally.

Maratsos, Katis, and Margheri continue the theme of close semantic comparison by looking at constructions with "basic emotion experiencer verbs" in English, Greek, and Italian. They begin with Schlesinger's (1992) observation that English speakers judge experiencers to have more control of a situation when coded as grammatical subjects rather than as direct objects. Then they note that for certain "emotion" verbs, Greek and Italian reverse the subject-object codings, and they ask whether the judgments of control will shift accordingly in conformity with Schlesinger's finding. The results are essentially negative. Although one can have questions about what makes some verbs "basic" and others "peripheral" (no criteria are given) and

whether they all really have to do with "emotions" (e.g., *suspect*, *believe*, *interest*, and *trust*), the grammatical differences between the languages and the challenge to Schlesinger's thesis both seem clear enough. What seems less clear is the status of the study with respect to the linguistic relativity question. Essentially, the argument is that "grammar affects the semantics of argument roles" by a "semantic coloring of the more peripheral members of the category" as measured by informant ratings of degree of control. In short, the question is whether speakers' conscious semantic judgments are sensitive to lexical form class. Since the entire analysis centers on language materials, the study cannot, in the view taken here, directly address the possibility of cognitive effects beyond language itself – unless, that is, we are willing to construe "language" as grammar and "cognition" as semantics. What the study does do is raise important questions about linguistic relativity proposals that depend on assumptions about the semantic significance of form classes. Also, in a very thoughtful discussion of their findings, the authors pose a number of troubling questions about the proper interpretation of the Schlesinger task-procedure itself.

In a programmatic paper, Györi sees language in general (and lexical semantics in particular) as primarily an instrument of cognition (rather than, say, social communication). As such, its function in his view is "to provide speakers with relatively stable, ready-made categories that fit the environment the language users live in." By studying linguistic change, then, we effectively study cognitive change, and we can see "how the linguistically established categories influence our view of the world, in this case, further categorizations." In short, a change in the environment requires a change in cognition, but that means a change in the linguistic system of categories that represents that world. In this sense cognition necessarily operates in terms of the language categories. Györi provides a number of examples of linguistic change in the service of illustrating some general processes at work. The paper is very suggestive in recognizing that linguistic change can provide a privileged site in which we can observe conceptual change unfold in a specific linguistic context. What will be needed to bring this approach to fruition, however, is a systematic comparison of patterns of change in different language families facing similar environmental challenges and, ideally, some corroborating evidence for the purported cognitive changes.

Rhodes provides the first steps towards using patterns of linguistic change to address empirically some of the issues involved in the linguistic relativity proposal. In particular, he uses examples of semantic change to challenge what he calls linguistic determinism by which he means a necessary match of linguistic morphology and "notional" (or denotational) category. He does this especially by identifying cases of mismatch between the two, that is,

cases where a stable set of denotational categories shifts its associated morphological forms and others where a stable set of morphological forms acquire new denotational meanings. Rhodes also notes that the relevant change seems to operate on lexical items at the "specific" rather than the "generic" level. Although it is important to emphasize that there is no intrinsic link between morphological form and meaning (with the obvious exception of onomatopoeia), as evidenced not only by linguistic change but also by simple comparison of language types, linguistic form remains an important guide to meaning in a particular time and space. Indeed, Rhodes himself readily assigns form-meaning correspondences at each point in time. So the more telling point about linguistic change is that by studying the shifting alignments of form and meaning we can get a glimpse of some dynamic semantic principles at work. This shows up most clearly in those examples where Rhodes is able to articulate the cultural logic or environmental circumstance prompting the change. None of this in itself demonstrates linguistic relativity both because it is not linguistically contrastive and because there is no specific nonlinguistic effect. But it does open another, more dynamic, window on semantic structure, one in which chains of change can provide important evidence of semantic organization analogous to that extracted from the study of concatenations in Schroten's paper and one in which one could imagine tracking differential interpretations of similar environmental or cultural changes.

## 4. Evidence beyond language structure: Cognition, discourse, and culture

The second group of papers all, in one way or another, appeal to some data beyond language itself to evaluate language effects. In this they illustrate the variety of ways one can go about detecting linguistic influences on cognition, discourse, and culture. The first two papers (Slobin, Imai) undertake cognitive comparisons by assessing patterns of memory and classification at the level of individual speakers. The last three papers (Bickel, Peeters, Tabakowska) all show how structural patterns in the language help sustain various discursive interactions and the broader cultural patterns built upon them. Collectively the papers represent some of the most prominent lines of attack on the problem currently available (see Lucy 1997a).

Slobin presents a portion of his ongoing comparative, developmental data on narrative development. He explores how a typological contrast between two structurally different ways of lexicalizing intransitive motion events relate to styles of representing motion events. Notice that in this project, Slobin

has joined both domain- and structure-centered approaches. He first asked speakers of different languages to respond to a common stimulus material (a children's picture book),[6] then undertook a systematic comparison of the structural patterns used in their responses (dividing languages according to Talmy's 1985 typology of satellite- and verb-framed languages), and now searches for reflexes of these structural differences in new arenas, both verbal and nonverbal. On the language side, in addition to the differences found in the picture-elicited narratives, he now reports similar patterns in the reading and writing of creative fiction, in talking and listening in conversation, and in patterns of accommodations showing up in translations. On the cognitive side he conducts an experiment assessing self-reports of mental imagery and memory for motion events by monolinguals and bilinguals. One can raise methodological questions about the use of spontaneous self report data, but even so the differences in performance are striking, and the strategy of probing the mental images that speakers productively form both represent clear efforts to move beyond verbal-production per se to questions of general cognitive representation. Although largely framed within Slobin's thinking for speaking paradigm, the study ultimately represents one of the most compelling lines of research currently underway on linguistic relativity proper: the differences are clear, pervasive, and robust. Since this project is ongoing, one looks forward to further explorations in the future.

Imai continues the theme of providing direct evidence of the cognitive impact of language differences. She shows that young Japanese- and English-speaking children learn to distinguish objects and substances in different ways as they acquire their languages and that, by adulthood, nonverbal categorization behavior comes to conform to these language-specific patterns. In conjunction with similar results from comparisons of Yucatec Maya and English (Lucy 1992b, Lucy and Gaskins Forthcoming), this provides striking evidence of the capacity for language to affect nonlinguistic classificatory behavior. A difference between the two sets of studies is that Lucy (1992b) takes a structure-centered approach and is led ultimately to question the ontological givenness of the object-substance dichotomy, seeing it instead as a discourse property assigned to entities in different ways in each language. Imai, by contrast, takes a domain-centered approach, that is, she defines a "domain of individuation" in which entities are either "complex objects," "simple objects," or "substances" quite apart from whatever language categorizations happen to "map" them. Perhaps this stance accounts for Imai's commitment to the universality of this ontological distinction despite her findings that it is not uniformly recognized by her samples.[7] What is crucial in the present case, however, is that this is the cleanest evidence for linguistic relativity articulated in this volume: there is a clear linguistic contrast and an

associated nonlinguistic cognitive assessment, and assessment that not only reveals population differences in classification preferences but also traces their emergence in childhood.

Bickel seeks to link language structure and cultural system through a practice approach. He begins by providing a systematic grammatical comparison of the systems of spatial reference available in Belhare (Tibeto-Burman) and Alemannic (Germanic). Belhare exhibits a dense grammaticalization of an "absolute" environmentally-based pattern of spatial reference whereas Alemannic shows a "relative" corporeal-based pattern. Experimental tests of transitivity inferencing and recognition memory patterned on those of the Cognitive Anthropology Research Group in Nijmegen reveal the expected Belhare bias toward "absolute" strategies. But Bickel is concerned to assess the wider sociocultural significance of these spatial forms. He finds that Belhare use depends on complex presuppositions regarding spatially significant local knowledge and practice. Likewise, Alemannic usage is tightly connected with the complex metaphoric extension of body to environment. The two spatial reference systems also help create the broader sociocultural environment by reiterating important social distinctions associated with them. For example, in Belhare location in the environment and social identity are co-constituted, reference to either one entailing specific reference to the other. As Bickel concludes, sociocultural categories "sustain the cognitive style and bias of awareness that is required by a particular grammar" and linguistic categories "are themselves formative in drawing attention to certain key issues and concerns." This all amounts to a demonstration that important structural relativity effects are fundamentally embedded in a set of public discursive practices. As such, the present study represents one of the best studies we have linking grammatical categories with broader sociocultural practices.

Peeters continues the focus on discursive patterns in a study of different sociopragmatic communicative norms among speakers of French and English. The French ideal is one of "engagement" in the interest of defending individual expression from the pressures of social constraint, whereas the Anglo-Saxon ideal is "not to commit oneself" in the interest of avoiding the risks associated with erroneous opinions and getting involved in other people's business. Evidence for these orientations at the cultural level is found in each culture in a series of common evaluative expressions deployed by each group with respect to engagement and commitment. These differences in communicative ideology are then related by Peeters to actual communicative norms such as patterns of interruption and to observed patterns of intercultural misunderstanding. Most of the argument depends very little on the grammar of either language, so the differences at stake here obtain pri-

marily at the discursive level. As such, it is difficult to make any argument as to whether the cultural orientations or the discursive norms are primary. Most likely, as the analysis suggests, the two are in constant, complex, and mutually reinforcing interaction. However, a suggestive exception appears in the more neutral meaning of French *mais* in contrast to English *but*. Here, simply learning and deploying the language forms properly directly facilitates smooth participation in the relevant interaction patterns. On the cultural side, it would be desirable to supplement reflective ideology with more cases of patterned nonverbal behavior or ideologies about cultural notions other than communication so that one could make a firmer claim about the impact of discursive practices on culture more broadly.

Tabakowska explores the role of religious speech in Polish in sustaining the cult of the Virgin Mary. This amounts to a behavior-centered approach at the discursive level in that the observed vitality of the Virgin cult represents the point of departure, and she turns to language to help provide an account for it in terms of the contribution of a distinctive register. She effectively outlines through exemplification how the religious register operates at many different levels in Polish: specialized archaic lexicon, specialized derivational morphology, reverential adjectives, and distinctive patterns of word order and collocation. Although she wants to eschew any rigid causal analysis in favor of an "osmotic merger" of language and conceptualization, it is nonetheless crucial to her analysis that the effects of these patterns on Polish thought are through the subliminal workings of the Polish language rather than through any awareness of the complex network of religious symbols and metaphors underlying those uses or any explicit teaching of the Catholic Church. That is, what language contributes to this cultural complex is a pervasive unconscious suggestiveness of the special status of the Virgin. It is noteworthy that many of the formal devices present in this register are common in religious discourse in many other languages.

## 5. Conclusion

The study of linguistic relativity is currently in a state of great ferment. These studies suggest the immense scope of issues we need to be considering. They cover the whole gamut of language from phonological patterns to grammatical pattern to lexical patterns to discursive norms, interactions, and genres. Work at each level has something to contribute to thinking about linguistic relativity. Likewise, these studies cover the whole gamut of outcome variables from language-internal processing and categorization effects to cognitive classification, inference, and memory on to social categorization and

cultural interaction styles. It is to be hoped that this series of studies will inspire others, not only to think seriously about this problem by drawing on the materials and methods closest to their own expertise, but also to push to develop new and more adequate ways of addressing the heart of the question, that is, whether the multifarious ways we speak influence the ways we think.

## Notes

1. For some of the reasons behind this neglect, see Lucy (1997a, Forthcoming). Claims (see Slobin This volume) that there is no scientific evidence that languages dramatically shape speakers' ways of thinking overlook how little evidence has ever been sought, not to mention the generally positive cast of the evidence we do have (Lucy 1992a, 1997a). Judgments that such results are not sufficiently "dramatic" cannot be a scientific judgment until one sets out the criteria for such a claim.
2. So just as in the 1950's we found the lexicon representing "language" in some studies and "cognition" in others (Lucy 1992a), now we find "discourse" representing "language" in some studies and either "culture" or "cognition" in others.
3. Bohn's surprise about my claim that there is little research on linguistic relativity stems from not understanding the historical requirement in the literature (Lucy 1992a) that there be a demonstrated nonlinguistic effect, a point clarified elsewhere in the article he cites.
4. Although Schroten refers to these as "basic" terms, no argument in support of this characterization is given.
5. These amount to covert categories in Whorf's (1956a) framework.
6. Unlike most "domain-centered" approaches (Lucy 1997a), Slobin's stimuli were not pre-selected to sample this spatial domain. However, the work does exhibit the key strategy of domain-centered approaches, namely, beginning research with a comparison of the linguistic treatment of a stimulus material.
7. This difference in stance may also account for Imai's repeated treatment of ambivalent group responses as signs of individual "confusion" resulting in "chance" responses rather than a different response baseline for the group.

## References

Lucy, John A. 1992a. *Language Diversity and Thought: A Reformulation of the Linguistic Relativity Hypothesis*. Cambridge: Cambridge University Press.

— 1992b. *Grammatical Categories and Cognition: A Case Study of the Linguistic Relativity Hypothesis*. Cambridge: Cambridge University Press.

— 1996. "The scope of linguistic relativity: An analysis and review of empirical research". In J. Gumperz and S. C. Levinson, (eds), *Rethinking Linguistic Relativity*. Cambridge: Cambridge University Press, 37-69.

— 1997a. "Linguistic relativity". *Annual Review of Anthropology* 26: 291-312. Palo Alto, Calif.: Annual Reviews Inc.

— 1997b. "The linguistics of "color"". In C. Hardin and L. Maffi (eds), *Color Categories in Thought and Language*. Cambridge: Cambridge University Press, 320-346.

— Forthcoming. "Afterword: The power of an idea". In J. Carroll (ed.), *Language, Thought, and Reality: Selected Writings of Benjamin Lee Whorf* (2nd edition). Cambridge, Mass.: MIT Press.

Lucy, John A. and Gaskins, S. Forthcoming. "Grammatical categories and the development of classification preferences: A comparative approach". In S. Levinson and M. Bowerman (eds), *Language Acquisition and Conceptual Development*. Cambridge: Cambridge University Press.

Pustejovsky, J. 1995. *The Generative Lexicon*. Cambridge, Mass.: MIT Press.

Sapir, Edward. 1949a. "The psychological reality of phonemes". In D. Mandelbaum (ed.), *The Selected Writings of Edward Sapir in Language, Culture, and Personality*. Berkeley: University of California Press, 46-60.

— 1949b. "Sound patterns in language". In D. Mandelbaum (ed.), *The Selected Writings of Edward Sapir in Language, Culture, and Personality*. Berkeley: University of California Press, 33-45.

Schlesinger, I. 1992. "The experiencer as agent". *Journal of Memory and Language* 31: 315-332.

Talmy, L. 1985. "Lexicalization patterns: Semantic structure in lexical forms". In T. Shopen (ed.), *Language Typology and Semantic Description, Vol. 3: Grammatical Categories and the Lexicon*. Cambridge: Cambridge University Press, 56-149.

Whorf, Benjamin L. 1956a. "Grammatical categories". In J. Carroll (ed.), *Language, Thought, and Reality: Selected Writings of Benjamin Lee Whorf*. Cambridge, Mass.: MIT Press, 87-101.

— 1956b. "Linguistics as an exact science". In J. Carroll (ed.), *Language, Thought, and Reality: Selected Writings of Benjamin Lee Whorf*. Cambridge, Mass.: MIT Press, 220-232.

# Part 1

# Evidence from Language: Production, Interpretation, and Change