Linguistics as a Cognitive Science

And Its Role in an Undergraduate Curriculum

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Over the past decade, cognitive science has developed in such a way that it is now more possible than it has ever been to gain insight into the general workings of the mind through the study of language. The reason is that language is not self-contained. It makes use of the apparatus of general cognition. The kinds of categories and processes used in language are the kinds of categories and processes used in cognition in general. The semantic system of a natural language is the conceptual system that we use in thought. The grammar of a natural language is a reflection of that conceptual system, as well as a reflection of the principles governing communication. As a consequence, the study of natural language syntax and semantics makes it possible to gain insight into the nature of thought, communication, culture, and literature.

It is for this reason that the undergraduates I teach are overwhelmingly enthusiastic about linguistics in the cognitive tradition. My students have a world of passionate interests: What is thought? How do people comprehend what they experience? Can a computer think? What is the relationship between the brain and the mind? What is learning? How is our political life affected by our modes of thought? Do people in nonwestern cultures have different conceptual systems? Why does miscommunication occur? Is it possible for us to change our cultural values? How is poetry understood? What is a scientific theory? Above all, they are trying to make sense of all the theories they encounter—theories of literature, theories of culture, theories of mind, philosophical theories, political theories, even linguistic theories?

They come from a wide range of departments. They are interested in linguistics because it takes a general cognitive perspective and because it has made progress in addressing such issues seriously, by giving detailed technical answers to carefully formulated, empirically studiable questions.

The three books I have written (or co-authored) over the past decade have been intended to do double duty both as contributions to cognitive linguistics and as textbooks that make it possible to address such questions in courses. Our department now has a set of cognitive linguistics courses. They are open without prerequisite. The students in these courses have tended to come from departments as diverse as mathematics, comparative literature, computer science, anthropology, philosophy, psychology, education, history, and art, as well as various language departments. They are sent by faculty members who have learned that linguistics has in recent years come to address issues of very general concern. The response of students to the subject matter has been overwhelming, no matter what fields they come from, and what students learn in these courses often change their perspectives on their own fields dramatically. After taking cognitive linguistics courses, students with such general interests often go on to take other linguistics courses in order to get a solid basis for exploring further issues both within and outside of linguistics proper that they have a deep interest in.

To get a sense of why students from other disciplines are interested in contemporary linguistics. let us consider some concrete questions from various fields that we take up in linguistics courses at Berkeley:

Literary Analysis: How can linguistics be of significant use in the study of literature, say in traditional problems of the analysis of metaphor, metonymy, imagery, and so on?

Literary Theory: What does linguistics have to say about the validity of various contemporary literary theories -- deconstructionism, hermeneutics, semiotics, and so on?

Metaphysics and Epistemology: Does the world come divided into natural kinds, defined by the essential properties of their members? Is reality independent of the minds of any beings? The standard philosophical views answer yes to such questions. Are these views correct?

Logic, Semantics, Human Reason and Imagination: Does formal logic capture anything real about human thought? If so, what? Where, if at all, do the methods of formal logic fail in the study of natural language semantics? What is the relation between reason and imagination.

Philosophy: What can linguistics contribute to the dispute between analytic philosophers and the anti-analytic philosophers (Rorty, Putnam, the various Constinental movements, etc.)?

Philosophy of science: What does linguistics have to tell us about what a scientific theory is? Is it consistent with deductive-nomological approaches? With a Kuhnian approach? What does it tell us about relativism?

Artificial Intelligence: Is a computer capable of meaningful thought? Is thought the manipulation of discrete symbols? Does linguistics have anything concrete to contribute to extending the domain of problems that AI can deal with?

Cognitive Psychology: How does linguistics contribute to our understanding of categorization and of cognitive schemata? What does it tell us about the nature of mental imagery?

Anthropology: Can linguistic methods help in characterizing a culture? Are conceptual systems universal, and if not. how do they differ? Does linguistics have anything to say about such traditional problems as kinship, and the characterization of significant cultural categories?

Neurally-inspired cognitive models: How well do connectionist theories mesh with what is known from linguistics about conceptual systems and

linguistic structure?

Although these concerns could be addressed in courses of many kinds, I have, because of my own specific interests, chosen to address these concerns in two courses: *Metaphor* and *Introduction to Cognitive Linguistics.*

Metaphor surveys results obtained since Michael Reddy's classic 1979 paper "The Conduit Metaphor" and Lakoff and Johnson's *Metaphors We Live By.* Those works demonstrated that thought is metaphorical and that much of everyday language is a reflection of metaphorical modes of thought that most people are not aware of. Since then, the study of metaphorical thought has been greatly expanded in a number of disciplines, as reflected in the bibliography below. For students of literature, I have just completed a new textbook on poetic metaphor with Mark Turner called *More than Cool Reason.* The other questions in the list are taken up in the *Introduction to Cognitive Linguistics* course, which uses as principal texts my *Women, Fire, and Dangerous Things*, and Gilles Fauconnier's *Mental Spaces.*

The Central Role of Linguistics In Contemporary Intellectual Controversies

One of the reasons that linguistics attracts so many students at Berkeley is that it is at the center of controversies in many fields. To understand the nature of these controversies and to be intelligently informed as to what they are, one simply has to know the relevant linguistics. Here are some of the areas where linguistics is at the center of current intellectual controversies:

Literary Theory: Deconstructionist analysis makes use of the doctrine of the "free play of signifiers", which is an adaptation of Saussearean linguistic theory. It also makes major use of De Man's (197?) approach to metaphor. Turner (1987) has claimed that evidence from metaphor research within linguistics is incompatible with the basic theory behind deconstructionist criticism. Since literary theory makes use of linguistic theory, the issue can be discussed intelligently only by those familiar with the requisite linguistics.

Philosophy: Traditional views in Anglo-American philosophy on a wide range of topics, including epistemology, the theory of meaning, the nature of rationality, and the philosophy of mind, have been vigorously challenged in recent years. Most of these issues arise in the context of debates over the empirical adequacy of the symbol manipulation paradigm, used in traditional artificial intelligence (AI) and generative linguistics. Here is some of the relevant literature:

The Traditional AI View: Haugeland (1985), Gardner (1985), Hofstadter and Dennett (1983).

The Anti-AI Reaction: Winograd and Flores (1985), Searle (1986), Dreyfus and Dreyfus (1986).

A Biologically-based Cognitive View: Churchland (1986), Rumelhart and McClelland (1986), Johnson (1987), Lakoff (1987), Langacker (1987).

The nature of language plays a major role in all these discussions.

Anthropology: Ideas from linguistics have traditionally played a major role in anthropological thinking. Previous generations of anthropologists, inspired by the work of Boas, Sapir, Whorf, and Levi-Strauss, have made important use of ideas from linguistics. That is no less true today. Holland and Quinn (1987) show how contemporary ideas about semantics derived from linguistics and other cognitive sciences affect current thinking about the nature of culture. Turner (1987) and Lakoff (1987) argue that current linguistic research requires a considerable change in our understanding of kinship concepts and, even more important, in our conception of cultural relativism.

Controversies Within Linguistics

Linguistics is anything but a static field. It is rapidly changing and expanding its domain. One of the reasons why it needs to be taught in more universities is that one cannot hope to pick up some all-encompassing basic text that will tell you all you need to know about the field. It needs to be taught by scholars who are keeping up to date on it and who are working actively in it.

Moreover, like any other vital field, linguistics has its share of internal controversy. Because other disciplines depend on results from linguistics, it is important that major controversial positions within linguistics be throroughly discussed and well-understood throughout the academic world. But, regardless of their impact on other disciplines, the controversies within linguistics are interesting in themselves.

Here are some current controversial issues in the field:

—What are the appropriate mathematical foundations for the study of language?

The traditional view of generative linguistics was that the mathematics of recursive function theory and (for many generativists) model theory should be taken as providing formal foundations for the field. This view is currently being challenged both within and outside of linguistics. There are two major challenges from outside linguistics.

Connectionism: Rumelhart and McClelland (1986) have provided a technique for neural modelling that, they suggest, will allow us to account for how the physical brain, which consists largely of networks of neurons, can learn, remember, reason, and process language. Their theory is, however, inconsistent with the generativist claim that recursive function theory and model theory provide the right foundations for linguistics. If the connectionists are right about how cognition is realized in the brain, then the theory of generative linguistics—at present the dominant theory—must be fundamentally mistaken, right down to its theoretical underpinnings. The debate has begun, and it promises to be one of the most important debates in the history of the cognitive sciences. What is at stake for cognitive science is our understanding of the relationship between the mind and the brain. What is at stake for linguistics is the most fundamental conception of what language is and what general linguistic principles are like.

Philosophy: Putnam (1980) has argued that, if recursive function theory is taken as the basis for syntax, then no adequate semantic theory is possible. For a detailed review of the issues, see Lakoff (1987).

Parallel arguments have come from within linguistics, where the adequacy of recursive function theory foundations is being challenged by both cognitivists and functionalists. An elaborate cognitivist alternative to the generative conception of language is offered by Langacker (1987).

In questioning the adequacy of recursive function theory and model theory as formal foundations, cognitivists and functionalists are raising the following kinds of issues:

—What is the role of discourse function in grammar?

—Is semantics truth conditional, or do cognitive approaches better account for semantic phenomena?

—Is semantics independent of pragmatics or is pragmatics just the semantics of speaking?

—Is there a semantic basis for grammatical categories?

—Are there any universals of pure form in syntax, or can all such purported universals be accounted for in semantic or functional terms?

—Are grammatical constructions real linguistic entities, or are they merely epiphenomena that arise from systems of general rules?

—Do linguistic categories show the same prototype and basic-level effects as other cognitive categories, or are they classical categories defined by

sets of features?

Different answers to these questions lead to radically different conceptions of language and thought. Part of the excitement of teaching linguistics to undergraduates is conveying to them the nature of the issues and of the evidence that bears on them.

Conclusion

In the great majority of colleges and universities in America, linguistics is barely taught at all, while disciplines that are intellectually dependent on results in linguistics are taught almost universally: philosophy, psychology, anthropology, literature, and artificial intelligence. The understanding of central issues in all those disciplines requires an understanding of linguistics, yet most institutions where those disciplines are taught have no significant offerings in linguistics, and certainly not sufficient offerings to provide students with what they need to know if they are to make sense of the great intellectual issues of the day. As a result, those colleges which do have wide-ranging offerings in linguistics offer significant advantages to students in a wide variety of disciplines.

My experience teaching undergraduates at Berkeley has been that they respond enthusiastically, and with awe and gratitude, to learning about the contributions that linguistics is making to central intellectual issues in their major disciplines. To those who are involved in hiring linguists, I would make a suggestion: Because the foundations of the field are themselves subject to important controversy, it is important to hire faculty who know various sides of the controversies, and who are familiar both with generative and cognitive-functionalist literature. Because graduate programs tend toward one pole or the other, that may well require hiring more than one person. Moreover, in addition to hiring faculty to teach linguistics for its own sake, I recommend strongly that faculty be hired who can also interpret the significance of linguistics for a general intellectual audience.

Some References and Readings

Because it may be of use in setting up undergraduate courses of general interest, I am including the list of readings used in the two courses I teach.

Readings in the *Metaphor* Course

Books

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