THE CHOMSKYAN TURN

edited by

ASA KASHER

Basil Blackwell

First published 1991

Basil Blackwell, Inc.
3 Cambridge Center
Cambridge, Massachusetts 02142, USA

Basil Blackwell Ltd
108 Cowley Road, Oxford, OX4 1JF, UK

Library of Congress Cataloging in Publication Data
The Chomskyan turn/edited by Asa Kasher.
p. cm.
Papers presented at the international workshop on "the Chomskyan Turn: Generative Linguistics, Philosophy, Mathematics, and Psychology," held Apr. 11–14, 1988 at Tel-Aviv University; organized under the auspices of the Institute for the History and Philosophy of Science and Ideas and of the Van Leer Jerusalem Institute.
Includes bibliographical references.
ISBN 0–631–17336–6
1. Linguistics—Congresses. 2. Chomsky, Noam—Congresses.
I. Kasher, Asa. II. Universitat Tel-Aviv. Institute for the History and Philosophy of Science and Ideas. III. Mekhon Van Leer bi-Yerushalayim.
P23.C46 1991
410—dc20 90–34846
CIP

British Library Cataloguing in Publication Data
A CIP catalogue record for this book is available from the British Library.

Typeset in 10 on 11pt Times
by Wearside Tradespools, Fulwell, Sunderland
Printed in Great Britain by
T.J. Press Ltd, Padstow, Cornwall.

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List of Contributors

Sylvain Bromberger: Linguistics and Philosophy, Massachusetts Institute of Technology, Cambridge, Mass.

Noam Chomsky: Linguistics and Philosophy, Massachusetts Institute of Technology, Cambridge, Mass.

Victoria A. Fromkin: Linguistics, University of California, Los Angeles.

Morris Halle: Linguistics and Philosophy, Massachusetts Institute of Technology, Cambridge, Mass.

Norbert Hornstein: Linguistics, University of Maryland, College Park, MD.

Asa Kasher: Philosophy, Tel-Aviv University, Israel.

Shalom Lappin: IBM, Yorktown Heights, NY.

Justin Leiber: Philosophy, University of Houston, Houston, Tex.

Robert J. Matthews: Philosophy, Rutgers, New Brunswick, NJ.

Robert May: Cognitive Sciences, University of California, Irvine, Cal.

Frederick Newmeyer: Linguistics, University of Washington, Seattle, WA.

Zenon W. Pylyshyn: Cognitive Science, University of Western Ontario London, Ont., Canada.

Tanya Reinhart: Linguistics and Poetics, Tel-Aviv University, Israel

Luigi Rizzi: Linguistics, University of Geneva, Switzerland.

Susan D. Rothstein: Linguistics, Bar-Ilan University, Ramat-Gan, Israel.

Ken Wexler: Brain and Cognitive Sciences, Massachusetts Institute of Technology, Cambridge, Mass.

Preface

Linguistics, says Chomsky in a 1977 interview[1], "has yet to undergo something like a Copernican or Galilean revolution in very crucial respects . . . This shift of intellectual attitude from concern for coverage of data to concern for insight and depth of explanation, and the related willingness to deal with highly idealized systems in order to obtain depth of explanation – this shift of point of view has taken place very rarely, I think, in the history of thought. In linguistics I don't think it has taken place, really."

In other words:–

> "How would you assess your own contributions to linguistics?"
> Chomsky: "They seem sort of pre-Galilean."
> "Like physics before the scientific revolution in the seventeenth century?"
> Chomsky: "Yes. In the pre-Galilean period, people were beginning to formulate problems in physics in the right way. The answers weren't there, but the problems were finally being framed in a way that in retrospect we can see was right. . . . [M]y feeling is that someday someone is going to come along and say, 'Look, you guys, you're on the right track, but you went wrong here. It should have been done this way.' Well, that will be it. Suddenly things will fall into place."[2]

If it has not taken a revolution to put us on the right track, if it has not been a major intellectual shift which has put us on it, then it sure has been a sharp turn that central parts of the study of language have taken. This has been what we call the "Chomskyan Turn."

An international workshop on "The Chomskyan Turn: Generative Linguistics, Philosophy, Mathematics and Psychology" took place at Tel-Aviv University and the Van Leer Jerusalem Institute, from April 11 to 14, 1988. All the papers in this collection were presented at this conference, though some of them have been meanwhile thoroughly revised.

Noam Chomsky read both the opening and the closing papers of the conference. Since these two papers can be naturally viewed as forming

parts of a unified presentation, they are published here together, as the first two chapters of this collection, its Part One.

Part Two of this book consists of papers, written by linguists, philosophers and cognitive scientists, whose contributions are directly related to major aspects of Chomsky's contributions to linguistics or to the adjacent fields of philosophy and psychology. Some of these papers discuss certain branches of language study: Phonology is the topic of *Bromberger and Halle*'s contribution, *Hornstein*'s paper is related to aspects of Semantics and *Kasher*'s to Pragmatics. Several papers address the "Chomskyan Turn" from certain psychological perspectives: *Matthews* discusses the "psychological reality" of grammars and *Pylyshyn* representational realism; *Wexler* focuses on language maturation. *Fromkin*'s and *Newmeyer*'s contributions are devoted to major developments in the history of Generative Linguistics, while *Leiber* considers facets of Cartesian Linguistics.

Part Three includes papers on syntax. *Rizzi*'s paper is on referential indices, in current theories as well as in earlier stages of Generative Syntax. The other four papers in this part of the book form a symposium on Logical Form. *May*'s paper discusses Syntax, Semantics and LF. *Lappin* and *Reinhart* present alternatives to May's views on LF. *Rothstein*'s comments on these different views.

The international workshop on the Chomskyan Turn was organized under the auspices of the Institute for the History and Philosophy of Science and Ideas and of the Van Leer Jerusalem Institute. We are very grateful to Yehuda Elkana, director of both, for his support, as well as to the administrative staff of these institutes, especially Yael Avner and Gabriela Williams, for their invaluable assistance.

Our meeting took place during the Intifada, the Palestinian uprising in the West Bank and the Gaza Strip. Much of everyone's attention was drawn to it in various ways. I assume I reflect an attitude shared by all the contributors to this volume, by dedicating it to the memory of all the innocent victims, in particular, the children, Arabs and Jews, Israelis and Palestinians alike, who were killed during the uprising. We share a hope: that no human being ever dies as a result of acts of injustice or war, oppression or terrorism. We have a dream: to see eradicted all such forms of human folly and wickedness. We have a goal: to see justice, peace and freedom soon reign through our part of the world.

Asa Kasher

NOTES

1 Conducted by Sol Saporta at the University of Washington; published in *Linguistic Analysis*, 4: 4 (1978), pp. 301–19, and republished, under the title "Language Theory and the Theory of Justice," in Noam Chomsky, *Language and Politics*, edited by C. P. Otero (Black Rose Books, Montreal and New York, 1988), pp. 232–50.

2 Conducted by John Gliedman; published in *Omni*, 6: 11 (1983), and republished, under the title "Things No Amount of Learning Can Teach," in Chomsky, *Language and Politics*, pp. 407–19.

Contents

Part I

1
Linguistics and Adjacent Fields: A Personal View

Noam Chomsky

I feel that I should begin, perhaps a bit ungraciously, by registering certain qualms about the general structure suggested for the conference, which I expressed to Asa Kasher when it was announced. Though the point is obvious enough, it may nevertheless be worth saying that to the extent that a subject is significant and worth pursuing, it is not personalized; and I think that the questions we are addressing are significant and worth pursuing. The topic "X's biology" – or economics, or psychology, or whatever – select X as one likes, could only have a useful sense in a primitive stage of some inquiry, a stage that one would hope would be quickly surpassed as the subject becomes a cooperative enterprise, with "X's linguistics," in our case, changing every time a journal appears, or a graduate student enters the office with some ideas to be thrashed out, or a classroom discussion leads to new understanding and fresh problems. All of this has been the norm for many years, fortunately, so that such phrases as "X's linguistics" are very much out of place, unless X is perhaps Panini or Wilhelm von Humboldt or Ferdinand de Saussure, with the understanding that even this is a substantial abstraction from a much more complex reality.

Similar comments apply to the proliferation of "theories" associated with one or another individual or group, again the sign of an immature discipline or a mistaken perception of the field as it actually evolves. To take a case that is close to home for me, such terms as "government-binding theory" should be abandoned, in fact should never have been used in the first place. Insofar as the concept of government enters into the structure of human language, every approach will have a theory of government, and the common task will be to determine just what this concept is and what exactly are the principles that it observes. Similarly, no approach to language will fail to incorporate some version of binding theory, insofar as referential dependence is a real phenomenon to be

captured in the study of language, this being a common enterprise. There are real questions about government and binding, but no tentative set of hypotheses about language has any proprietary claim to these topics. The same is true far more broadly, with no need here to provide examples. If some approach to the study of language really does have doctrines or privileged notations that are not subject to challenge on pain of "abandoning the theory," some kind of perceived disaster, then we can be fairly confident that this approach is a byway to be avoided in the search for serious answers to serious questions.

Since I have been accorded the privilege of both opening and closing the conference, I will address the questions with which many of us are concerned in a fairly general way. I will try to outline how the study of language looks today, at least to me; how it reached its present stage, concentrating on the less familiar earlier period of contemporary generative grammar when leading issues began to be formulated in a way that sets a framework for much that has happened since; what kinds of problems are, realistically speaking, on the current research agenda; and what more distant ones remain out of reach although they may animate and in some ways guide current inquiry. I also want to consider how all of this relates to broader questions about mind and knowledge and behavior that have deep roots in our cultural and intellectual history. There is hardly a phrase in what I will say that is not controversial, and naturally I will not attempt here to resolve doubts that justly arise at every point; rather to sketch a path through a maze of obscurity that seems to me a plausible one, and one that has certainly been productive even if it will ultimately be shown to be misdirected.

Beginning with the broadest context, the study of generative grammar developed within what some have called "the cognitive revolution" of the 1950s, and was a significant factor in initiating this change of perspective with regard to human nature and action. To a certain extent it has remained so, though interests and assumptions, which were rather disparate from the start, have often diverged.

Notice to begin with that the terminology is inflated. Though it was not known at the time, and remains little understood today, the so-called "cognitive revolution" was in large measure a return to earlier concerns and reconstructed earlier understanding, long forgotten, sometimes in new ways. I include here such matters as representational-computational theories of mind, the Turing test for human intelligence, the question of innate conditions for the growth of knowledge and understanding, certain basic insights of Gestalt psychology, and much else. These ideas were developed and explored in a fairly lucid and thoughtful way in what we might call "the first cognitive revolution" of the seventeenth and eighteenth century.

If intellectual history were linear, continuous and cumulative, in place of the actual record of erratic leaps, false starts, and all-too-frequent regression, we could say, in retrospect, that the cognitive revolution of the 1950s, including the development of generative grammar, represents a kind of

confluence of ideas and insights of the first cognitive revolution with new technical understanding about the nature of computation and formal systems that developed largely in this century, and that made it possible to formulate some old and somewhat vague questions in a much clearer way, so that they could be subjected to productive inquiry in a few domains at least, language being one.

The cognitive revolution is concerned with states of the mind/brain and how they enter into behavior, in particular, cognitive states: states of knowledge, understanding, interpretation, belief, and so on. An approach to human thought and action in these terms takes psychology, and its subfield of linguistics, to be part of the natural sciences, concerned with human nature and its manifestations and particularly with the brain. Accordingly, it is avowedly mentalistic in a specific sense of this term, this being the other side of the same coin.

The brain, like any other system of the natural world, can be studied at various levels of abstraction from mechanisms: for example, in terms of neural nets or computational systems of rules and representations. At each such level of inquiry, we construct certain abstract objects and seek to determine their properties and the principles they satisfy. We try to show how, in these terms, we can provide explanations for puzzling phenomena. We also hope to discover how these abstract entities are realized in physical mechanisms of a more "fundamental" nature and how the principles can be grounded in this way. Neural nets, for example, are highly abstract objects; they remain unchanged if molecules are replaced or some chemical transmission or reorientation of components takes place. The same is true of computational systems of rules and representations. We may refer to the study of these systems as part of the study of mind, but merely as a matter of terminology that respects certain historical antecedents without raising any novel metaphysical quandaries; we may refer to the mind, or the mind/brain, in the context of this abstract inquiry into physical properties of the brain. We take the abstract objects we construct to be real insofar as they enter into explanatory theories that provide insight and understanding.

All of this would be proper and appropriate procedure even if it had no models elsewhere. But in fact, it follows a familiar course. Though analogies should not be pressed too far, much the same has been true in the better-established natural sciences. For example, nineteenth-century chemistry and early twentieth-century genetics were concerned with such theoretical abstract notions as chemical elements, organic molecules, valence, the Periodic Table, genes and alleles, and so on. Discoveries about their nature led to attempts to discover more fundamental mechanisms to account for their properties and the principles that govern them. This proved to be no simple task. In the case of nineteenth-century chemistry, the concepts of fundamental physics were quite radically modified to achieve this goal, with the development of quantum theory, which explained "most of physics and all of chemistry" (Dirac) so that "physics and chemistry have been fused into complete oneness . . ."

(Heisenberg).[1] The discoveries of early genetics, in contrast, were essentially accommodated by mid-century within known biochemistry. In the case of the study of mind, we cannot now know which of these possibilities reflects the physical reality. It would come as no great surprise if the physical sciences, as currently understood, were to prove incapable of incorporating and accounting for the properties and principles of mind, just as Cartesian mechanics could not account for the motion of bodies, as Newton showed, and just as nineteenth-century physics could not account for properties of chemical elements and compounds.

Putting such speculations aside, we turn to the questions that we can realistically formulate and address within the theory of mind, now understood as an integral part of the natural sciences; in particular, in the study of language. The basic concept, which identifies the subject of inquiry, is the concept of "having" or "knowing" a language. We take this to be a cognitive state, a certain state of the mind/brain. Concerning this concept, three fundamental questions at once arise:

1 What constitutes knowledge of language?
2 How is such knowledge acquired?
3 How is such knowledge put to use?

There is also a further question: how can we integrate answers to these questions within the existing natural sciences, perhaps by modifying them? This question remains beyond reach, or rather, is premature. Just as nineteenth-century science provided essential guidelines for the physics of the subsequent period, so the study of mind should serve as a guide for the brain sciences of the future, exhibiting the properties and conditions that must be satisfied by the mechanisms of the brain, whatever they turn out to be.

At least in a rudimentary form, these questions were beginning to be the topic of lively discussion in the early 1950s, primarily among a few graduate students. In Cambridge, I would mention particularly Eric Lenneberg and Morris Halle, and also Yehoshua Bar-Hillel, whose role as a perceptive and sympathetic critic and constructive participant has been much undervalued. While we approached the issues from different starting points and backgrounds, there was a shared skepticism about the prevailing climate of opinion and increasingly, a shared perspective and a growing sense that the lines of thought we were pursuing, which related in complex ways to other developments of the period, were on the right track. I will not try to sort out these interactions here. Within a few years, a relatively coherent point of view had developed, which still seems to me essentially correct.

Each of the three basic questions that frame this inquiry has a classical flavor and earlier antecedents, as did the "cognitive revolution" generally. None of this was evident or more than vaguely sensed at the time, a fact that is not without interest. It reflects significant features of the social and cultural history of the period and the reigning political climate, important topics that I will not pursue here.

We might plausibly refer to the first and central question – what

constitutes knowledge of language? – as *Humboldt's problem*, referring, in the first place, to his insight that language is a system that provides for infinite use of finite means. We may take these finite means to constitute a particular language; to know the language is to have these finite means represented in the mind/brain. Crucially, Humboldt regarded language not as a set of constructed objects, say, utterances or speech acts, but rather as a process of generation; language is *eine Erzeugung*, not *ein todtes Erzeugtes*. With a bit of interpretive license, we could understand him to be saying that a language is a generative procedure that enables articulated, structured expressions of thought to be freely produced and understood.

Notice that there is interpretive license in this account. In Humboldt's day, one could not clearly distinguish between, on the one hand, an abstract generative procedure that assigns structural descriptions to all expressions, and on the other, the actual *Arbeit des Geistes* that brings thought to expression in linguistic performance. There are passages in Humboldt's writings that suggest one or the other interpretation, sometimes with fair explicitness, but to attempt to determine which notion he had in mind is an error, since the two concepts were not clearly distinguished, and could hardly have been, the relevant concepts being lacking.[2] The conception of generative grammar that developed in the 1950s crucially, and properly, distinguishes these conceptions, distinguishing diachronic from synchronic in the manner clarified in modern linguistics, distinguishing performance from competence (in the sense of possession of knowledge), and construing knowledge of language as incorporation in the mind/brain of a generative procedure taken in the abstract sense.

From this point of view, the language faculty is regarded as a particular component of the human mind/brain. It has an initial state, an element of the human biological endowment that appears to be subject to little variation apart from severe pathology, and is also apparently unique to the species in essentials. Under normal conditions of social interaction, the language faculty comes to assume a steady state at a fixed maturational stage, a state that does not subsequently undergo fundamental change. This steady state – and, indeed, earlier transitional states – is characterized in terms of a generative procedure taken abstractly; this constitutes the acquired language understood as a psychological particular, now abstracting from the complexity of the actual social world in accord with familiar idealizations that are appropriate and indeed quite indispensable. Insofar as some group of individuals are not too different in the individual languages acquired, we may speak loosely of language as a community property, recognizing that there is little to say about the matter of any generality or significance, so it appears. I will return briefly to alternative conceptions.

In Humboldt's day, means were lacking to express these ideas clearly, and the insights were dismissed and largely forgotten. But by the mid-twentieth century such technical understanding was readily available, and the questions could be formulated, squarely faced, and very productively studied.

At an intuitive level, a language is a particular way of expressing thought and understanding the thought expressed (see note 4). To know a language is to have mastered this way of speaking and understanding. Rephrasing this intuition within a theory of mind understood in the terms of the "second cognitive revolution," a language is a particular generative procedure that assigns to every possible expression a representation of its form and its meaning, insofar as these are determined by the language faculty. The language, so construed, "strongly generates" a set of structural descriptions; we may take this set to be the structure of the language. This is essentially the point of view developed in my unpublished manuscript *Logical Structure of Linguistic Theory* of 1955 (*LSLT*),[3] differing only in terminology.

Since the terminology that was adopted has led to some confusion, which impeded subsequent research and led to much pointless controversy and still does, let me say a word about it. The standard practice of the time was to use the term "language" to refer to what Humboldt called "ein todtes Erzeugtes," "the totality of utterances that can be made in a speech community" in Leonard Bloomfield's phrase, or the set of well-formed expressions, in the usage of the study of formal systems such as formalized arithmetic. The influential American linguist William Dwight Whitney, contemptuously dismissing what remained of the rationalist and Humboldtian traditions at the origins of modern linguistics, defined language "in the concrete sense" as "the sum of words and phrases by which any man expresses his thought," with little of any generality to be said about this "vast number of items, each of which has its own time, occasion, and effect." "The infinite diversity of human speech," he said, "ought alone to be a sufficient bar to the assertion that an understanding of the powers of the soul involves the explanation of speech," a view repeated by Edward Sapir, who insisted that "speech is a human activity that varies without assignable limit," "a purely historical heritage of the group, the product of long-continued social usage" with no "instinctive base."[4] Such conceptions were reiterated for a long period, removing essential topics from the study of language in the mainstream professional discipline, because they could not possibly be studied in these terms. These practices were no doubt encouraged by the empiricist and behaviorist assumptions that prevailed in later years, which engendered the misconception that the set of expressions that constitute language "in the concrete sense" is somehow "given" or "closer to the data" than the "grammars" that characterize it. Again, a serious misconception, one that remains common in the literature.[5] The array of expressions made available for use by the means provided by a language is plainly not "given." Rather, what is given is some finite collection of data, which can be interpreted as evidence for a theory that might – or might not – assign some privileged status to a particular set of expressions. In the case of natural language, I think it probably does not, but whatever the facts may be in this regard, the "totality of expressions" or set of well-formed sentences is a high-level abstraction, further removed from mechanisms than the generative procedure that is held to specify it