

# *Grammar as Science*

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*Supported by the  
National Science Foundation*

The MIT Press  
Cambridge, Massachusetts  
London, England

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This book was set in Times Roman and Univers by SNP Best-set Typesetter Ltd., Hong Kong.

Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Larson, Richard K.

Grammar as science / Richard K. Larson ; designed and illustrated by Kimiko Ryokai.  
p. cm.

Includes bibliographic references and index.

ISBN 978-0-262-51303-6 (pbk. : alk. paper)

1. Grammar, Comparative and general—Syntax—Textbooks. I. Ryokai, Kimiko. II. Title.

P291.L33 2010

415—dc22

2008054058

10 9 8 7 6 5 4 3 2 1

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**PART I    Setting Out**

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The study of grammar once enjoyed a central place in education, one going back to the classic liberal arts curriculum of the late Middle Ages. Grammar was, along with logic and rhetoric, one of the subjects in the trivium: the core group in the seven arts students were expected to master. The importance of the “big three” is reflected in our modern word *trivial*, which originally applied to knowledge regarded as so basic that it required no argument. Any educated person could be assumed to know it.

In an earlier time, studying grammar primarily meant studying Latin and Greek. Access to the classical languages meant access to the root cultures of the West, their literature and science. Latin and Greek were viewed as “special languages”: models of clarity, logical organization, intellectual subtlety, and economy of expression. Studying how these languages worked was viewed as something very close to studying the principles of logical, coherent thought itself. When other languages were analyzed, they were always analyzed on the model of Latin or Greek.

The curriculum in which grammar held its place of honor is obsolete now; the time when educated people could attend only to the classics of the West is long past. Furthermore, we now know that Latin and Greek are, by any reasonable standard, typical human languages: in no way clearer, subtler, or more logical than, say, Greenlandic Eskimo or Chinese. The old rationales for studying grammar are gone. Is the relevance of grammar behind us, too?

Not at all! In the last five decades, the subject of grammar has been reborn in a very different setting. Grammar has emerged as part of a new science, linguistics, that poses and investigates its own unique and fascinating set of questions, pursuing them with the same rigorous methodology found elsewhere in the study of natural phenomena. This new scientific perspective on grammar owes much to the linguist Noam Chomsky, who introduced it in the mid-1950s and who has contributed centrally to its development ever since.



When we study human language, we are approaching what some might call the “human essence,” the distinctive qualities of mind that are, so far as we know, unique to man, and that are inseparable from any critical phase of human existence, personal or social. Hence the fascination of this study, and, no less, its frustration.

—*Language and Mind*, p. 100

Noam Chomsky  
Institute Professor  
Massachusetts Institute of Technology

The idea of a “scientific” approach to grammar might strike you as odd at first. When we think of “science,” we usually think in these terms (see Goldstein and Goldstein 1984):

- Science is a search for understanding.
- Achieving understanding means discovering general laws and principles.
- Scientific laws and principles can be tested experimentally.

How do such notions apply to grammar? What is there to *understand* about grammar? What would general laws and principles of grammar be? And how might we test laws and principles of grammar experimentally, assuming we could find them in the first place? Our puzzlement about these questions suggests a certain implicit view of language, and the kind of object it is.

## Language as a Natural Object

From a very early age, children appear to be attuned to the distinction between **natural objects** and **artifacts**. In an interesting series of experiments, psychologist Frank Keil has shown that whereas very young children judge the identity of objects largely on the basis of superficial features, at some point they begin to realize that certain kinds of objects have an inner essence that may sometimes be hidden or obscured (see Keil 1986). For example, before a certain age children will identify a black cat that has been painted to look like a skunk as a skunk, whereas after this age they identify a black cat painted to look like a skunk as a painted cat and not as a skunk. They realize that being a skunk involves more than looking like a skunk; the true identity of an object may be concealed by appearances.

Interestingly, in making this transition, children seem to draw an important distinction between natural objects, like cats and skunks, and artifacts (things made by humans). Although they judge a painted cat to be a cat nonetheless, they understand that an old coffeepot that has been modified into a birdfeeder is now really a birdfeeder. In other words, they see natural objects as having their own defining properties, whereas artifacts are whatever we make them to be, as a matter of convention.

Human language can be viewed in both these ways, as artifact or as natural object; and how we view it strongly shapes our reaction to the facts it presents us with. Language has been seen by many people as an aspect of culture, similar to other basic human institutions and traditions like tool-making or agriculture. In this view, languages are the product of human imagination and development: created by humans, taught by humans, and learned by humans. They are cultural artifacts possessing the properties and obeying the rules that we bestow on them, and the patterns or regularities we find in them are basically just matters of convention. Like the birdfeeder, language is what we've made it to be, and there is no more to say. There is no question of understanding anything, or discovering anything, or testing anything. It is this broad view of language, I believe, that leads to puzzlement when we think about grammar as science.

But language can instead be seen as a part of the natural world. In a series of influential works, Noam Chomsky has argued that human language is more correctly viewed as a natural object, analogous to a limb or a bodily organ (see Chomsky 2000a). True, language arose in the course of human prehistory, but it was no more invented or developed by humans than arms or lungs. Rather, language ability evolved, like other species-specific properties. Likewise, although languages develop in the course of human ontogeny, they are neither taught to nor learned by children, any more than children are taught to grow arms or learn to have hearts. Rather, we humans speak and in so doing provide the environment—the “nutrition,” to use a Chomskyan metaphor—in which language can grow and develop in our children.

Under this perspective, languages become objects of the natural world much like quasars or spinach leaves. They are entities whose properties and structure are to be determined by naturalistic investigation. Accordingly, when we are faced with a certain pattern or regularity in linguistic facts, we do not put it aside as a matter of convention; rather, we start to look for a “law” or principle that predicts the pattern and suggests an explanation. And we realize that the explanation may well be hidden to us, and need to be tested for experimentally. Adopting the naturalistic perspective opens up human language as a new domain, a fresh territory for scientific exploration.

## **The Terrain Ahead**

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This book is an introduction to the modern subject of grammar (now called **syntax**) from the perspective of language as a natural object. Its goals are twofold:

- To systematically explore some of the ideas and results in the new territory of syntax, and
- To provide experience with rigorous scientific reasoning and argumentation, and the development of scientific theorizing.

Successful exploration requires open eyes and a clear head. You need to be observant about your immediate surroundings (so you won't miss anything). You need to be mindful of how you got there (in case you need to retrace your steps or reconstruct your route for others). And you need to be logical about where you will go next (so you don't just blunder about).

This book consists of short units that usually involve some specific factual point(s) and a small number of ideas or concepts. These will be your "immediate surroundings" as we proceed. Try to read and master each unit in a single sitting. Be observant, and try to see all there is to see.

When the terrain is unfamiliar, where you are and how you got there are sometimes difficult to keep in your head. Maps are useful for this purpose. The units of this book are grouped into parts that form the map of the territory we'll be exploring:

- Meeting the subject and discovering its questions (Part I)
- Constructing a theory that attempts to answer the questions (Part II)
- Choosing between competing theories (Part III)
- Arguing for one theory versus another (Part IV)
- Searching for deeper explanation (Part V)
- Following the many consequences of a theory (Part VI)
- Enlarging and constraining the tools that a theory employs (Part VII)

Since these divisions mark the stages that researchers typically pass through in constructing a scientific theory in any domain, they make a good general "route plan" for us. At the beginning of each part, we will stop and do a "map check" to make sure we know where we've gotten to and where we should go next. Often we will consult a guide, someone more familiar with the area.

Science is tentative, exploratory,  
questioning, largely learned by doing!  
—“Rationality/Science,” p. 91



You won't need much in the way of equipment to undertake this trip. The presentation assumes no previous experience either with grammar or with the broader discipline of linguistics. All you will need is a healthy sense of curiosity and a willingness to think critically about a subject matter (language) that most of us take for granted in day-to-day life and rarely think about at all. With that much, we can begin.