Grammar as Science

Text by
Richard K. Larson

Graphic design by
Kimiko Ryokai

The MIT Press
Cambridge, Massachusetts
London, England

Preface for Teachers

The undergraduate curriculum has traditionally been viewed as a domain in which students are introduced to broad issues of life, society, and thought, and where skills of general application and utility are developed and strengthened. On the traditional view, the goal of an undergraduate program is not to recruit and train potential graduate students, but to inform individuals about the wider implications of a field, and to foster in them the intellectual skills that that field especially draws upon.

This book arose out of an effort to rethink part of the undergraduate curriculum in linguistics at Stony Brook University in line with the traditional goals of undergraduate education. Specifically, it represents an attempt to reconsider the structure and content of the introductory syntax course from the standpoint of three broad questions:

1. What is the general educational value of studying syntax?

2. What broad intellectual issues are engaged in studying syntax?

3. What general intellectual skills are developed by studying syntax?

The answers embodied in *Grammar as Science* are the following:

1. Syntax offers an excellent instrument for introducing students from a wide variety of backgrounds to the principles of scientific theorizing and scientific thought.

2. Syntax engages in a revealing way both general intellectual themes present in all scientific theorizing and ones arising specifically within the modern cognitive sciences. For example:

   • How does a scientist construct, test, evaluate, and refine a theory?

   • How does a scientist choose between alternative theories?

   • What constitutes a significant generalization, and how does one capture it?

   • When does a scientist propose or assume unseen objects or structure, and how are such objects or structure justified?

- How secure is scientific knowledge?
- Can one study a human phenomenon as a natural object and gain scientific understanding of it?
- What is the nature of a mental object like a language?

3. Syntax offers an excellent medium through which to teach the skill of framing exact, explicit arguments for theories—the articulation of hypotheses, principles, data, and reasoning into a coherent, convincing whole.

This book is intended both for undergraduates who are majoring in linguistics and for undergraduates who are taking linguistics courses through a department of linguistics (as opposed to a department of English or anthropology) but do not plan to become majors. In my experience, such students generally do not have significant science background and hence can especially profit by a course of this kind.

Grammar as Science is not an introduction to scientific theorizing, with syntax serving as a novel domain to illustrate concepts and results. Rather, it is an introduction to syntax as an exercise in scientific theory construction. In view of this, *Grammar as Science* covers a good deal of standard territory in syntax. The teacher will find here discussion of core topics such as phrase structure, constituency, the lexicon, inaudible elements, movement rules, and transformational constraints. At the same time, the broad goal of developing scientific reasoning skills and an appreciation of scientific theorizing has entailed some divergences between *Grammar as Science* and other introductory syntax books.

First, there is less stress here than elsewhere on providing an up-to-date introduction to syntactic theory, employing state-of-the-art technical tools. If the guiding aim is to get students to think precisely and explicitly about natural language structure and to grasp the process of constructing a theory of that structure, then the exact tools used in the construction are not of paramount importance. What is important is that the tools be precise, explicit, and relatively easy to use. I have found traditional phrase structure rules to be a very natural first tool in formal language study, one that students take to readily, and one that permits a very direct grasp of the relation between linguistic rules and linguistic structure. Accordingly, I make free use of phrase structure rules throughout this book, despite their being largely obsolete in current linguistic theory.

Second, this book covers a somewhat narrower range of topics than other books. Again, this is because the primary goal is not to cover the modern field of syntax, but to introduce students to the process of grammatical theory construc-

tion as a scientific enterprise. *Grammar as Science* is structured so as to encourage general reflection on this enterprise. The units are organized thematically into sections that bring out important components of the enterprise, such as choosing between theories, constructing explicit arguments for hypotheses, the need for explaining linguistic phenomena (as opposed to simply describing them), and the conflicting demands that push us toward both expanding and constraining our technical tool set. The choice of topics is always guided by this larger programmatic goal.

Grammar as Science was conceived as part of a "laboratory science" course, in which students collect and actively experiment with linguistic data. The book is made up of a large number of relatively short units, each corresponding to a single class session. The main concepts for each unit are typically few, and arise in response to specific empirical questions and challenges that are posed. To aid in making the laboratory experience real for students, *Grammar as Science* is designed for use with Syntactica, a software application tool developed at Stony Brook University that allows students to create and explore simple grammars in a graphical, interactive way. *Grammar as Science* can be used independently of Syntactica as a stand-alone text, but my experience has been that Syntactica adds much to the course. Specifically, use of this tool

- Confers a dynamic character on the process of hypothesizing grammars. Students can "try the rules out" and see what happens.

- Permits an incremental approach to building grammars. Students can add one rule after another and check consequences at each stage.

- Confers a measure of "objectivity" on the issue of whether a rule set does or doesn't generate a given tree. If the rules a student has written are correct, the program will generate the tree. Students find this quite compelling.

- Inculcates habits of precise thinking and expression. Computers insist upon a level of precision in their input that is not negotiable.

- Provides a natural route to asking questions about human syntactic knowledge and its representation. For example, in what way are we or aren't we like a machine in which the relevant rules have been entered?

The text layout of *Grammar as Science* was conceived and executed by Kimiko Ryokai. It follows Japanese design principles, which emphasize visual/graphic organization of material. I have found that this format helps students to understand and retain the material; they also find it enjoyable.

Its good intentions notwithstanding, *Grammar as Science* could doubtless be improved in many ways. I warmly welcome all criticisms, comments, and suggestions for revision.

Richard.Larson@stonybrook.edu.