Genes, Brains, Evolution and Language

Half a century ago, Noam Chomsky posited that humans have specific innate mental abilities to learn and use language, distinct from other animals. This book, a follow-up to the author's previous textbook, *A Mind for Language*, continues to critically examine the development of this central aspect of linguistics: the innateness debate. It expands upon key themes in the debate – discussing arguments that come from other disciplines, such as psychology, anthropology, sociology, criminology, computer science, formal languages theory, neuroscience, genetics, animal communication, and evolutionary biology. The innateness claim also leads us to ask how human language evolved as a characteristic trait of *Homo sapiens*. Written in an accessible way, assuming no prior knowledge of linguistics, the book guides the reader through technical concepts, and employs concrete examples throughout. It is accompanied by a range of online resources, including further material, a glossary, discussion points, questions for reflection, and project suggestions.

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The Innateness Debate Continued

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Additional resources to accompany the text can be found at www.cambridge.org/GenesBrainsLanguage

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Preface

This book (*Genes, Brains, Evolution and Language: The Innateness Debate Continued*; GBE) starts where my previous book (*A Mind for Language: An introduction to the Innateness Debate*; ML) left off. The central theme of both books is to examine the idea that humans have specific innate mental abilities to learn and use human languages. Other animals are not able to learn human language, even with intensive training, which is not to say that they do not have their own ways of communicating. An idea that both books focus on is that humans are born with mental abilities that are *specific* for learning language. This idea is called the *Innateness Hypothesis for language* (IH). According to this hypothesis, this language-specific ability (which does not mean specific to a given language, like English, but specific to language in general, as opposed to other cognitive systems) is encoded in neural circuits in the brain, based on genetic specifications. Children acquire language, using this innate system while being exposed to the language that caregivers use, specifically when directed to them. The interaction between an inborn language capacity and language input will be recognized as a specific case of the debate about the roles of "nature" and "nurture," which forms the backdrop of our discussion of the IH that was proposed by the linguist Noam Chomsky more than half a century ago. What predictions does this hypothesis make and what are the arguments in support of it? *A Mind for Language* critically discusses the arguments that have been suggested, based on the study of how languages work, how children acquire them, and how they change over time. We also considered arguments based on the emergence of new languages. I call these arguments *the linguistic arguments*. The present book will discuss additional arguments that have been, or could be, used to support the Innateness Hypothesis from other disciplines than linguistics, such as several social sciences (psychology, anthropology, criminology, and so on), computer science, neuroscience, genetics, the study of animal communication systems, and evolutionary biology. My goal with both books has *not* been to defend the IH. Rather, my hope is that readers will form their own views, given the information that I provide. Even though both books form a continuing narrative, reading this book does not necessarily

presuppose reading the first book. Chapter 1 reviews the general theme that both books share as well as the linguistic arguments presented in ML.

In writing both books over a period of time, it is fair to say that my own position on Chomsky's IH has shifted, but this shift is in part caused by the fact that Chomsky himself has changed his views on what the innate language system contains. In his early work, this innate system, called Universal Grammar (UG), was claimed to be a richly structured system that laid out a lot of things that children got for free, in advance of experience, which then explained that the task of forming a mental grammar based on impoverished input was much smaller than if this task had to be carried out from scratch, aided only by general cognitive learning abilities. His claim was not accepted by empiricists, who were of the opinion that the whole of language could be learned based on said cognitive principles. In later work and to this day, Chomsky has retreated from claiming that UG is very elaborate, suggesting that it is in fact very minimal, perhaps only containing a single, universal operation (called Merge) that underlies the formation of syntactic structure. Admitting that mental grammars contain more than just that, he has embraced much of the empiricist viewpoint while at the same time attributing properties of language to general "laws of physics." Even though this shift is discussed in ML, that book considered arguments for innateness that largely presupposed this richer conception of the innate language system. This sequel book reflects this shift more clearly. I show that the issue of innateness remains even if a narrow view of UG is embraced. However, I am also critical of this new and narrow understanding of innateness and the view on what human language really is that it entails, namely a universal system to organize thoughts rather than a system for communication that reckons with the diversity of human languages.

Like its prequel ML, the present book can be used to cover the content of a one-week semester course for undergraduate students. However, it is possible to compress the subject matter of both books into one course if certain choices are made. In both books, most chapters can be read independently of each other. When used as a textbook, it is up to the instructor to select specific chapters or sections of chapters for "obligatory" reading, while summarizing other chapters or sections (which could then be "optional" further reading for invested students). While most chapters are between twenty and thirty-five pages long, some longer chapters have been explicitly divided into sections such that each section matches that approximate number of pages. Chapter 1 will tell the reader in some detail what the present book covers.

Separate websites that accompany both books contain a set of discussion points, questions, and exercises for when the books are used as textbooks. In addition, the accompanying website to the current book, as an aid to Chapter 6

(*Language and the Brain*) and Chapter 7 (*Language and the Genome*), brief offers introductions to the fields of neuroscience and genetics.

It is not assumed that students or other readers have taken an introductory course in linguistics. Chapter 6 of *A Mind for Language* contains an introduction to the basic structure of language, but any other brief introduction to linguistic concepts will do. In Chapter 2 of the current book, I offer a summary of ML, chapter 6 that should suffice to give the reader a general understanding of the structure of language and some key terminology.

While the focus of my two books is on the nature and nurture of language, I have taken the opportunity to tell the reader about the many facets of language that make this phenomenon such a fascinating subject for every curious person. Readers will find out that the subject matter of both books combined is highly interdisciplinary. This is what has always attracted me to this topic because it allows me to learn and write about other fields of science than my own.

Notes for each chapter can be found at the end of the book. These notes contain many references to articles, book chapters, and books that provide more detailed information concerning statements and information in the chapters. It is scholarly practice to provide such references. However, on a first read, I do not want the reader to go back and forth between the text and the endnotes. This would interrupt the flow of the narrative. When a closer study of the text is desired, I recommend that readers consult the notes if they want to be directed to additional sources. There is an abundant and growing literature about the subjects that are covered in the chapters and I have tried to provide references that can be used as a starting point for further inquiries, but careful searches on the internet will undoubtedly direct invested readers to trustworthy sources that provide recent advances. In addition to the references in the endnotes, this book ends with a section that functions as a quick reference to books and articles for further reading.

In conclusion, a disclaimer of sorts: The reader of this book (and its prequel) is reminded that both books were written to be used for undergraduate "General Education" courses. The backgrounds and "levels" of the students are diverse, and most of them were in high school just a year or two before they sit in on the courses that are based on the two books. Given the interdisciplinary nature of our central subject, I feel that it is necessary to reinforce important information by repeating it, using varied wording and examples. This may disturb more advanced readers, but I hope that my presentation style does not throw them off too much. Given the wealth of information contained in this text, students are usually worried about "what they need to know." My answer to them is this: Well, if I say it a couple of times, it is important, and you should know it. Another factor is that most chapters are meant to be accessible independently, which is important if not all of them are used for a course. For this reason, every chapter *can* be read on its own. A final point that I want to clarify is this. In both

this book and its prequel, I cross-reference chapters in "the other book." This is never meant to say that the reader must consult the chapter in the other book before continuing reading.

It is my hope that both books, while published as textbooks for undergraduate courses, can be read as "popular" science books that are accessible to any person who takes an interest in the nature–nurture debate, especially in the context of human language acquisition, or in human language in general. This includes every person I have ever spoken to about what it is that "keeps me off the streets."

Acknowledgments

Given the complexity of human language, it is not possible for any linguist to be a specialist in all areas of grammar. In addition, when discussing language in a broader context, entering other fields of science, it is impossible to do this without the help of colleagues who are experts in these fields. Writing this book, I often felt I was going outside my "comfort zone" (which is a specific area of linguistics called phonology). I want to thank all the students and colleagues who have given me feedback, have asked questions or pointed me to areas of research that were new to me, or alerted me to mistakes in my representation of other fields. I specifically thank the four Cambridge University Press reviewers who gave me guidance on how to improve the original manuscript, as well as the reader who commented on an earlier draft of the whole book. I am also thankful to several colleagues who read specific chapters and provided me with a lot of very helpful comments: Chapters 4 and 5 (Diego Krivochen, Victor Longa, Juan Uriagereka), Chapter 5 (Hossep Dolatian, Jeff Heinz, Jon Rawski), Chapter 6 (Peter Hagoort, Nicholas Brennan, Andrea Moro), Chapter 7 (Simon Fisher, Victor Longa, Colleen Spurling), Chapter 8 (Dorit Bar-On), and Chapter 10 (Liljiana Progovac, Christian Tryon). I am very grateful to Péter Siptár who read the whole book and provided me with many helpful comments. Finally, I want to express my gratitude to Jeroen van de Weijer, who has helped me over many years to get this book (and its prequel) into its present form, and for his work on the indices. Of course, all errors that remain are solely my own responsibility.