

## 1

## What This Book Is About

### The Central Theme of Our Inquiry

The central subject of this book is the so-called (and seemingly never-ending) “nature–nurture” debate, the beginning of which can be traced back to the earliest written sources more than two millennia ago, especially in the work of the Greek philosopher Plato (see Chapter 3). In plain terms, this debate is about how people (although the issue arises for nonhuman species as well) get to know and do what they know and do. The two extreme views (which, as we will see, no one really holds) are (a) that all human knowledge, and thus the behavior that is dependent on this knowledge, is *innate* (which in modern terms means that it all somehow comes from our genes) and (b) that all knowledge and behavior is learned, which means that it is due to *environmental influences*, that is, parental input, education, and life experience, or, put more generally, *sensory experiences*. Given the long history of this debate, someone might gasp at the sight of yet another book that is devoted to this issue (and that, moreover, does not claim to solve the issue). It is no exaggeration to say that probably every week a new book or article appears in which the nature–nurture issue is the central theme, sometimes declaring that the debate is “dead.”<sup>1</sup> But the history of the debate and the fact that people cannot stop being interested in it indicates something very important.<sup>2</sup> Humans are inevitably invested in finding out “what kind of animal they are” and what makes “us” so different from other species. Humans are *curious* animals in general (which is a big part of what we are), but it would seem that our curiosity *about ourselves* trumps everything else. In a sense, we are the biggest mystery in the known universe. This is, I strongly believe, why we keep raising the nature–nurture issue, realizing that the debate takes on new forms as we learn more from results in many different disciplines. And even though no one has solved the mystery (at least in a manner that satisfies everyone), we have learned a lot in the process of this never-ending quest of trying to understand who we are. Often arguments are repeated, but there is definitely progress and perhaps even reason to expect that a resolution is in sight.

As will become clear, the issue is vast. We know and do many different things, ranging from breathing, eating, and sleeping to creating works of art, establishing complicated societies and legal systems, loving or hating

## 4 I Introduction

each other and, finally, being able to use language to express our thoughts and feelings. Therefore, without losing sight of the generality of the debate, I think it is useful to focus our attention on one specific kind of human knowledge and behavior and then try to unravel the arguments that have been put forward for the roles of nature and nurture in the development of this particular kind of knowledge and behavior. With specific reference to this capacity, we can investigate the arguments in favor of or against the idea that aspects of this capacity have a genetic grounding. In short, we need a *testing ground*, a case study, a subject that allows us to tackle the wide-ranging nature–nurture question. In this book, our case study is the *human capacity for language*. To focus on language is a good choice because, according to many people, it is precisely language that is a central component of the human mind and that, moreover, sets us apart from “the beast.” It has often been said that language is a fundamental characteristic of what it means to be human. For clarity, when I use the term *language*, I refer to human language, that is, the specific communication system that uses words and sentences. All other communication systems will be called just that: communication systems.

My choice of language as a case study, apart from my being interested in this subject as a linguist, is also motivated by other considerations. Within linguistics (the science that studies all aspects of human language), the debate has been especially lively (to put it mildly) since Noam Chomsky suggested in the late 1950s that “most of language is innate.” The idea of postulating an innate language ability, which leans toward the nature pole, has had a profound influence in the field of linguistics for over sixty years, as well as in “neighboring fields” such as philosophy, psychology, anthropology and, more generally, all fields that deal with human behavior.<sup>3</sup> This, however, does not mean that Chomsky’s ideas were and are uncontroversial. His proposal stood in contrast with the dominant (in the United States at least) psychology school of *behaviorism*, which regarded language as something that is completely learned. Despite contributing to the demise of behaviorism, many scientists have objected to Chomsky’s insistent reliance on innate language knowledge. Those who opposed the view that knowledge of language arises due to an innate capacity that is specific to language have tried to show that knowledge of language can emerge from general cognitive capacities that guide the learning of many things, including language. The debates that unfolded give us a good sense not only of the kinds of arguments pro and con that have been proposed, but also of how the positions of the different proponents have changed over the decades that followed Chomsky’s radical thesis.

There are several additional reasons for choosing language as our focus. First, the mind is invisible and elusive. Brain-imaging techniques, such as

CT scans or EEGs, can make broad aspects of a working brain visible on a computer screen, but this is still a far stretch from “seeing the mind in action.” Many researchers claim that we can learn most about the mind by observing what people do and how they behave. In this light, human language, being a widespread, indeed universal, form of behavior, can be a “window on the mind,” especially because, unlike many other forms of behavior, language would appear to be a rather direct manifestation of what happens in the mind. More than any other form of behavior, with the possible exception of body language and facial expression, language is used by people “to speak their mind,” thus revealing what “is going on up there.” A further good reason for choosing language as our testing ground is that our understanding of this phenomenon has grown tremendously over the last sixty years, and much of the work has tried to understand the interplay of learning and innate knowledge. Finally, linguistic behavior can be studied quite easily; it is easier to gather and analyze linguistic behavior than many other things that people do. This is not to say that linguists fully understand how languages work. A tremendous amount of work remains to be done.

While the idea of adding another publication about the nature–nurture debate is ambitious (perhaps presumptuous), my goal is modest. I do not intend to offer a grand new theory that claims to solve this issue once and for all (not even just with reference to language), nor will I try to defend an extreme view. Rather, as a linguist, I will focus on the arguments that have been presented to support the thesis that the “knowledge” of language that enables humans to produce and comprehend “words and sentences” is rooted in an innate capacity. This capacity is specific to language, forming a bridge between the language input that children receive and the mental grammar that they construct. I will examine arguments pro and con the Innateness Hypothesis. Even though I will focus on language, we will need to visit many other disciplines besides linguistics, because language can be studied from many different angles (which is why this subject is so fascinating). It will become clear that almost all arguments can also be brought to bear on the same question with reference to other mental capacities (such as our musical capacity, mathematics, or our moral system, or generally every area that deals with human knowledge and behavior). It is my hope that the present book will provide the reader with enough background to participate in the never-ending debate with an educated, open (although not blank) mind, no matter what the focus of the debate is. (And, meanwhile, as a bonus, the reader gets to learn a lot of interesting things about the phenomenon of human language.)

There are people who claim that the nature–nurture debate is dead, while others are convinced that it refuses to go away. After reading this book, the reader may have developed an informed opinion on this matter.

## The Arguments in Support of the Innateness Hypothesis

Many different arguments have been advanced to support the idea that the knowledge that people have of their language, or languages, is rooted in an innate system that guides the construction of their mental grammars in early childhood. We can make a broad distinction between two types of arguments, which I call *linguistic arguments* and “other” arguments. Linguistic arguments are based on the study of language proper: its structure, how it changes over time, how children acquire it, and how it can be manifested in different modalities, such as speech and sign. The second class of “other” arguments draws into the discussion a variety of other disciplines, such as semiotics, computational approaches, neuroscience, genetics, animal communication systems, and evolution. To combine both classes of arguments into one book (and one course) turned out to be inadvisable. The present book focuses on the linguistic arguments. A sequel book entitled *Genes, Brains and Evolution: The Language Debate Continued* (henceforth GBE) covers the “other” arguments.<sup>4</sup>

### What Is Innate?

When Noam Chomsky proposed his Innateness Hypothesis for language, his view was that most of language is innate and that the innate system (‘called’ Universal Grammar, ‘UG’) was a detailed “template” of the mental grammar that the child must construct based on the language input. Over the years, views on what this innate system contains have changed based on specific ideas on how this system interacts with the input. Such developments are discussed in Chapter 6, which outlines the organization of the mental grammar. In the more recent developments (since the 2000s), Chomsky has retreated from claiming that most of language is innate to the modest claim that there may only be a single innate ability that is specific to human language. In this view, what differentiates human language from all other human and nonhuman communication systems, or cognitive systems in general, is the ability to form an unlimited number of sentences that permit combinations of words and, crucially, *combinations of such combinations*, which establish a hierarchical structure.<sup>5</sup> What this means can be illustrated with the following three sentences:

- (1)
  - a. Mary said *something*.
  - b. John fell down the stairs.
  - c. Mary said *that John fell down the stairs*.

Sentence (1c) combines sentence (1a) with sentence (1b), by replacing “something” with a sentence. This creates a structure in which a sentence like (1c) can be said to contain a sentence. It is easy to repeat this “trick”:

(2) Mary said that she heard from Bill that John fell down the stairs.

As shown, using this trick, we arrive at *nested structures* in which a sentence can contain a sentence that itself contains a sentence. We could call this the “Russian doll effect,” although in the case of language, there is no principled end to how “deep” the embedding of sentences inside sentences can go on. What usually stops us from pushing this too far is that people might lose track of what we are trying to say; not to mention that we might lose track of that ourselves. The ability to create sentences of unlimited length, and thus the ability to create an infinite number of sentences, is what Chomsky, but also linguists before him, regards as the hallmark of the human capacity for language. Humans can “do” language because in their minds they possess a grammatical system that allows them to do so. This system is necessarily finite. Yet it allows us to produce and understand an infinite set of sentences. In his current thinking, Chomsky regards this as the basic property of human language, adding that it is the core and perhaps the only content of our innate ability for language. It is not obvious that this “minimal” view of such an innate system is tenable. Not every linguist who calls themselves a *nativist* (i.e., a supporter of the claim that humans have an innate capacity for language) is on board with this minimal view. This means that the development in Chomsky’s thinking provides further material for studying the nature–nurture debate, not only between his followers and his opponents, but also among those who followed his original ideas but not necessarily all the consequences of his later, minimalist, ideas.

As we will see, we will see, the development of Chomsky’s ideas, as well as the efforts of his opponents *and* supporters to show how aspects of language can be learned using general, innate cognitive capacities that are not specific to language, have narrowed the gap between the original advocates of the extreme all-or-nothing views.

## Not Two, but Three Factors

With his shift toward a minimal innate language capacity, Chomsky has adopted the view that the structure of mental grammars cannot be solely dependent on the language input and a minimal Universal Grammar (UG). He has come to recognize what are called “third factors,” UG being factor 1 and the input factor 2. In his conjectures about what these third factors might

be, we find the kinds of general learning capacities that his opponents have always mentioned, which in their view do not require any innate knowledge that is domain-specific to language. However, Chomsky seems to be more interested in another class of third factors which involve “laws of nature” that underlie the structure of many organic and even inorganic systems in the natural world. As we will learn, he is not the only one who has tried to find what are essentially language-external explanations for the structure of language. A problem is that, currently, the class of third-factor explanations is very heterogeneous and discussions are very speculative. In this book I will only occasionally refer to third-factor explanations, but in GBE, chapter 4, I discuss third-factor approaches in more detail. Here I will just mention one example that adds plausibility to the expectation that the structure of mental grammars can be dependent on third factors. The mental grammar is part of the human mind. As such, it is physically instantiated in terms of brain processes that involve activities of brain cells. One could say that the mental grammar is a collection of *data structures* and *programs* that run on a machine that we call the brain. It is necessarily the case that the nature of this machine, like any machine, imposes possibilities and even preferences for certain types of mental computations, but it also imposes restrictions. Typewriters and calculators are different machines, which means that you can’t write a letter on your calculator or add up numbers with your typewriter. This analogy is meant to support the idea that the brain machine, due to its physical properties, must play a role in constraining what mental grammars look like or can do. It could furthermore be the case, or even be likely, that the physical organization of the brain reflects general laws of nature (perhaps ultimately grounded in physics) that can also be found in other complex systems in the natural world. This is an important line of reasoning that is followed in the pursuit of third factors. Interestingly, this pursuit could lead to the ultimate conclusion that the first factor (UG) is no longer required. We then still have a nature–nurture debate, albeit one in which what we mean by *nature* is much more general than just genetic factors.

## Fleshing Out the Debate?

This book adopts the view that a defining aspect of our humanity (or, as people say, of our *human nature*) is our *mind* and that a central aspect of the human mind is that it allows us to have language. Indeed, humans have a mind for language.

It is an understatement to say that it is not so easy to define the notion of “mind.” For the moment, let us say that our mind is a broad collection of memories, facts, feelings, ideas, thought patterns, knowledge about how

to do things and how things work. We must also add that the mind takes care of “what the body does.” It regulates our sensory systems (seeing, hearing, etc.) and many other functions (like blood circulation, digestion, etc.). Some would say that, in an abstract sense, *everything* that makes up our mind is *information* (“data”) and *information processing* (“programs”). Importantly, the information is not static. We constantly add new “data” by using both our senses and our ability to *process* (i.e., combine, transform, etc.) whatever information we have already stored in the mind. Perhaps we also sometimes add new ways of processing information (new “programs”). Clearly, with this “working hypothesis” of what the mind is, we have to acknowledge that a large part of our mind works *subconsciously*. It has often been claimed that we are not aware of most of what is going on in our mind. For example, we know that our mind controls our bodily functions, but we do not know what is going on and, frankly, we do not care either, as long as everything works well.

As a thinking machine, our mind can direct our attention to anything under the sun and beyond. Many great mysteries are involved, such as: What is the origin of our universe or how did life come about? Nevertheless, experts throughout the ages have claimed that the biggest mystery is the mind itself. Indeed, a question that has forever been on people’s *minds* is: *How does all the information and processing that makes up our mind get there in the first place?* As far as we can go back, we see philosophers and religious thinkers ponder this Big Question, and today there is a constant flow of books and articles trying to answer it. Needless to say, there are many different viewpoints. As we have already mentioned (and here ignoring the role of third factors), two extreme answers are possible: (a) the mind arises gradually in the course of development (from fertilized egg to “full-blown person”) and a lot of it is based on “learning,” that is, either due to simply experiencing the world, even while still inside the womb, or to explicit instructions from caregivers (parents, teachers, peers, and so on); (b) a lot of what we might think of as being learned is really *innate*, that is, it arises in the course of development “by itself” without recourse to what surrounds us and to teachers. Somehow, these innate aspects of the mind are “genetic.”

To make it more manageable, let me break down the Big Question into several smaller questions:

- Is the mind mostly “a blank slate” when people are born (like an empty hard drive, or an empty notebook), with no information present? (The mind starts developing before birth, so that is an issue that we have to consider when we ask this question.)
- If so, does this mean that our mind emerges due to experiencing the world through our senses, which are, in a way, like information input

## 10 I Introduction

devices? (If so, we say that the information is due to *nurture*.) Of course, information could also result from explicit instruction and teaching, which also falls under nurture.

- Or is it the case that all information is there “from the start,” that is, part of our biological *nature*, ultimately our genes? (Here some people like to say: all knowledge is instinctual.)
- Or is it both, nature *and* nurture? (Just like when we come to class with a workbook that has a lot of the information already printed, with blanks for us to make additional notes.)
- If both nature and nurture play a role, are these two factors additive or is there an intricate interaction between our genes (nature) and experience (nurture)?
- If we assume that our minds are *not* entirely blank slates at birth (or whenever the mind starts developing after conception), what makes human minds different from the minds of other species?

If we assume that nature and nurture both play a role, most people do not see each factor as contributing a certain “part” or “percentage” to the knowledge that is contained in the mind, hence they are not additive. It would seem that a better understanding of the issue is that both factors (nature and nurture) are in a sense inseparable. Both seem necessary, but not in complementary ways. I can make this clear by an analogy. Suppose someone hears violin music and then asks you: which part of that music comes from the violin and which part is due to the violinist? That question doesn’t make sense, right? Both are necessary to produce the music. I encourage the reader to think of the interplay between nature and nurture in the same way, even though we may easily slip into the suggestion that they are independent factors, as indeed many writers have done when presenting the issue.<sup>6</sup>

The nature–nurture issue is very “interdisciplinary” since it occurs in all areas where human behavior is involved. This is why it comes up in books, courses, and conferences in fields like economics, anthropology, sociology, criminology, various subfields of psychology, philosophy, linguistics, biology, and so on. I refer the reader to GBE, chapter 3 for a survey of how this debate plays out in a variety of disciplines. The interdisciplinary character of the debate makes it easy for most readers to relate it to fields that they are familiar with.

I started this section by asking what we mean by “mind.” It may seem less necessary to ask what we mean by “language.” However, as we will see in this book, and perhaps surprisingly, what we take “language” to be (in the sense of “human language”) is also subject to much debate. For now, let us agree on the fact that language involves two things. On the one



hand, there is a mental capacity (which we will call the *mental grammar*) that comprises the words that we know and mechanisms for producing and understanding combinations of these. On the other hand, language is the directly observable effect of applying this knowledge in behavior which takes the form of producing and understanding audible sentences and, moreover, an ability to judge whether utterances that people make are grammatical, that is, follow the rules of the mental grammar. (We will see that language can also operate in the visual domain, when we consider sign languages such as American Sign Language.)

When I ask people how they got to know their language, they invariably answer that they learned it from their parents. It does indeed seem obvious that the language that you speak depends on your environment. This might cast doubt on my idea to use language as a test case for the nature–nature issue. It would seem rather obvious that language results completely from nurture. Noam Chomsky received a lot of attention in the late 1950s by arguing (against the mainstream nurture view at the time held by the behaviorists B. F. Skinner and J. B. Watson) that humans are born with a capacity for language which specifies all the “universal” properties of the mental grammar as well as choices for properties that can vary. This viewpoint came to be known as the *Innateness Hypothesis* (for Language). Chomsky made the strong claim that this capacity is not just a general capacity to learn things (like learning to make pizzas or learning how to write), but rather a capacity that is *specific to the domain of language*, and we must assume that this capacity evolved for the specific purpose of “learning” language. This idea inspired many linguists to look at language and language acquisition in a different way and made the question of how precisely children get to know their language the central question of linguistics, which it has been for the last (more than) half a century.

Following Chomsky’s lead, scientists studying other human forms of behavior then also proposed that there might be specific innate knowledge of other kinds as well. No one doubted the fact that humans have some rather remarkable learning capacities, but Chomsky’s viewpoint entailed that humans have a variety of innate, very *specific* capacities (called mental modules), each evolved to facilitate a specific kind of behavior. What are the arguments in favor of this bold claim? Not everyone came on board with the innateness of domain-specific modules, and recently it would appear that more and more people resist it. Simultaneously, Chomsky’s own ideas also developed in ways that seem to weaken his original claims. All this shows that the nature–nurture dialogue is ongoing with views swinging from one extreme to the other, and compromises in between.

## Where Do I Stand?

It is fair to ask this author where he stands. Does the fact that the subtitle of this book mentions the “innateness debate” imply that I lean toward the nature view? Being a product of learning about linguistics during the Chomskyan era, I have been surrounded (and influenced) by the idea that our language abilities are rooted in an innate system that is specifically dedicated to language. This system, which is “genetic” (i.e., part of our nature), together with the language input (nurture) that we as children receive, drives us to construe a *mental grammar* that allows us to produce and understand an infinite number of language utterances. I believe that there can be no doubt that humans have a “mind for language” (which is the main title of this book). Other animal species cannot learn or handle human languages because they have different minds. Despite what you believe or may have heard, chimpanzees cannot do this. Mastering language cannot just be a matter of having a brain or being “intelligent.” In fact, as far as we know, no other animal species can “do” human language (although they certainly can do many things, including communicate with each other using different, species-specific kinds of systems); see GBE, chapter 9, for detailed discussion of these issues. While seeing language as a mixture of nature and nurture seems inevitable, most people as mentioned, when you ask them how they learned their language, will answer: “from my parents.” After reading this book, this is likely no longer going to be your answer.

For me, the central question is which factors enter into in the construction of mental grammars by infant language learners. What is the role of the input? Are there genes that play a role in the acquisition and development of language? Which other factors (cognitive or otherwise) constrain the form that mental grammars (and by implication languages) can take?

When, initially, the choice was between nature (genes) and nurture (input), what drove participants in the innateness debate to different corners was the question of whether the crucial cognitive (genetically based) abilities are *specific* to language or of a more *general* kind. Meanwhile, views also differed on the “quality” of the input, which Chomsky called “poor,” while others argued that the input might be much richer than Chomsky had claimed. We have seen that Chomsky himself has changed his views over the years, in that he has gradually minimized the amount of required innate knowledge that is specific to language. This has led to conjectures that the form of mental grammars is constrained by the physical properties of the brain, or physical laws more generally.

In this book, and its sequel, I have tried to be open-minded about views from various perspectives, but also to show that there is progress in finding