Born to Parse

How Children Select Their Languages

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Preface

This book is about the acquisition of language by young children. For all children, acquisition begins very early, arguably in utero, when they often respond differently to the sounds their mother makes in her language than to sounds from other sources. Initially, for example, babbling happens with a wide range of sounds, drawn from all the languages of the world and possibly even beyond, and steadily narrows to the smaller number of sounds that the child will use for the rest of her life, selecting them for what we will be calling her internal language. There is nothing voluntary about this, no more than children decide voluntarily that it would be good to see in three dimensions. They just get on with it, growing their language system as their biology demands, developing the sounds they will use and the structures. Deaf children develop a gestural system and express their thoughts by that means. Much interesting work has been done on these early stages of acquisition, but this book will focus on what happens a bit later, in the extraordinary third year of life. In that year, syntax emerges rapidly and children develop into more or less full-fledged human beings. This holds regardless of whether the language users surrounding the child are speakers or signers, who express thoughts with equal richness.

Every parent has witnessed this apparent miracle. In that third year, children come to express and understand a wide range of

thoughts in a language that they discover, select, and make their own, perhaps an individual, private form of what we call, say, Japanese or Javanese. Children experience and produce a finite number of expressions but they have the capacity to understand and use an infinite range. Once they can say something simple like *Heidi made that*, they might also understand similar structures like *Kirsten saw the movie there* and *Eric ate the cake when Alex drank OJ*. And so on, literally ad infinitum, in principle. Sometimes it is hard to make out the words but it gets easier as children fine-tune the sounds of their language and fine-tune the syntactic system in ways I will elaborate.

There is much for scientists to discover, many things that vary from one language user to another, but a central theme of this book is that, just as some birds are born to chirp, ants to follow a chemical trail back home, so humans are born to parse, born to assign fine-grained linguistic structures to what they experience. Everybody does it, normally at about the same age. These linguistic structures are drawn from a range of possibilities defined by invariant principles that have been discovered over recent decades and that are required to interpret particularities of the surrounding external language. Parsing is key.

There have been significant conceptual and technical shifts over past decades in our understanding of the abstract, INVARIANT principles of language, which are a function of what linguists call UNIVERSAL GRAMMAR (UG) and do not need to be learned (I use small caps for the first instance of major technical terms). Those shifts lead now to new approaches to parsing and to new analyses of VARIABLE properties. Variable properties show up in some but not all languages and do need to be learned; they differ from language to language, unlike invariant properties. We can take a new approach to language acquisition and there are good reasons to do so, because there are difficulties with our current notions of language variation and acquisition.

Children DISCOVER the structural CONTRASTS manifested by the variable properties in the ambient language, beginning with the contrasts among sounds or gestures on which their language system will be built. A little later, as they experience their ambient language, they begin to SELECT the first elements of their language system, which they need in order to understand what is said. Children parse with their emerging grammar. In parsing, they identify nouns, verbs, and other categories that may vary somewhat from one language user to another. They assign linguistic structures to the external language they hear, which TRIGGERS specific internal elements required for specific aspects of the parse. Children use what UG makes available, notably the binary-branching structures that emerge from recursive, bottom-up procedures called Project and Merge, plus what their emerging system, already partly formed, affords them. We used to call that system a grammar, but more recently we call it an I-LANGUAGE, *I* for internal and individual, emphasizing the fact that the internal system holds for an individual's brain and not for groups of people, like the group of all English speakers.

External language (E-LANGUAGE), on the other hand, is a very different kind of entity, language out there. It is what a child hears, and it is not structured, not discrete, nor represented in people's brains. E-language has no inherent structure but has structure assigned to it through parsing, after an initial I-language has begun to be triggered. If E-language shifts, for whatever reason, children may assign different structures, parse differently from earlier generations of language users, and thus attain a new grammar, a new I-language. What those new parses are and how they are selected by the innovative children provides information about acquisition and explains new variable properties emerging through new parses. Both E-language and I-languages play crucial, interacting roles: unstructured, amorphous E-language is parsed and an I-language system results.

There is no EVALUATION of I-languages and no PARAMETERS defined at UG. That, I will argue, has been an ill-chosen wild-goose chase. Rather, it is time to pursue a new vision of what variable properties are and how some are selected by young children, with UG open in ways I will describe. There is no miracle here; all children go through a similar kind of development, and we can achieve substantial scientific understanding of it.

We can have a more productive research paradigm if we abandon the search for parameters defined at UG, discard any evaluation metric, and dispense with positing an independent element of cognition known as a PARSER. That will represent a major simplification, reducing the machinery required for our theories and minimizing the information being attributed to our biology, along the lines sketched by proponents of the Minimalist Program. In eliminating UG-defined parameters, evaluation of grammars, and a distinct parser, I aim to make a substantial contribution to Minimalist ambitions.

Rather than seeing parsing as a processing "approximation" or "add-on" to the grammar, we will connect parsing more tightly to the grammar. This emphasis on integrated parsing echoes work by Bob Berwick, Janet Fodor, Heidi Getz, Marit Westergaard, Virginia Valian, Colin Phillips, and others. Phillips (2003a,b) works under the motto of "the grammar is the parser" and like him, I will dispense with an independent parser. Instead, I will focus on how children might use their internal language system to assign linguistic structure to what they hear, that is, to parse their ambient, external language. That enables them to select structures in their internal, private language. As a result, I adopt a new vision, at least within generative perspectives on acquisition: parsing is central to that vision, but it is implemented by the emerging language system, not by an independent parser.

There are some good case studies that point to a productive new paradigm, but we will also examine some difficult cases that show where new work is needed and how that new work should be con-

ducted. We will focus on these difficult cases, on what is needed to improve analyses as our research paradigm is recast. Thinking in terms of parameters has led to much interesting work on variable properties, and that will need to be reconstrued in this new paradigm. Thinking through difficult cases where things remain to be discovered will be helpful for making the transition from one paradigm to another. I will be keen to show that under the new paradigm, we can have good empirical coverage as we make our radical simplifications.

Part of the pleasure of writing a book like this is to show people in related disciplines how linguists have come to analyze language acquisition and variation, in the hope that this will inform analyses of other areas of human cognition: memory, spatial cognition, emotion, and beyond. This book is written for philosophers, psychologists, neuroscientists, and linguists who see themselves as addressing questions of cognitive science broadly. A good case can be made that vision and language are two areas of human cognition where successful theories have been developed. Linguists have sometimes followed the lead of vision scientists, and understanding how languages may vary, how they are parsed by young children, may now cast light on the acquisition of other cognitive capacities and lead to deeper understanding. I shall include enough technical information to give the ideas real substance but shall use as little jargon as possible to make ideas accessible across disciplinary boundaries.

In putting together books of this kind, authors try out ideas in papers and lectures. Lectures include those given in classes at our home universities and some on the road. Readers familiar with my earlier work will recognize that the ideas here continue the commitment to examining "the logical problem of language acquisition" that I first formulated in *The Language Lottery* in 1982 and to "cue-based acquisition" from *The Development of Language* in 1999. Since then, ideas have changed significantly, as reflected in Lightfoot 2017b, as a result of the emphasis on parsing in a particular,

grammar-based way. Those changes were first explored in lectures I gave at the Beijing Language and Culture University (BLCU) in 2015, where I learned from the lively linguistic community led by Fuzhen Susan Si. In fact, China has played a significant role, thanks to two visits generously organized by Ping Li, which also allowed me to try out ideas at the 2015 Brain Science meeting in Shenzhen and in 2018 at Jiangsu Normal University in Xuzhou, at Shanghai Jiao Tong University, and again at BLCU. I also presented these ideas in lectures at Newcastle University in the UK, including one as part of their Insights public-lecture series, at the Universities of Connecticut and Pennsylvania, and at the nineteenth Diachronic Generative Syntax meeting (DiGS 19) in Stellenbosch, South Africa. I am immensely grateful to those audiences and to the individuals who followed up afterwards.

There is nothing quite like being able to sustain a thorough investigation over the period of a fifteen-week course, and I am indebted to students in my Georgetown Diachronic Syntax class in spring 2019, who worked with a preliminary draft of this book. I am grateful to the three outstanding referees who advised MIT Press under the editorship of Marc Lowenthal; they all knew my work over a long period and understood how and why it had changed over recent decades, giving me much helpful advice about how to knit my story together and make it fit more coherently. John Whitman and Waltraud Paul helped me with the analysis of Chinese, and Heidi Getz proved to be an invigorating coauthor when we put our work together and came to understand the similarities in our analyses and the differences (Getz & Lightfoot to appear). Heidi and I share a view that linguists' reliance on parameters leads them to underestimate the richness of learning in the acquisition of language. Enriching the learning involved by basing our analysis of it on parsing offers a good alternative to analysis through parameters.

Psychologist Betty Tuller has become a partner in so many ways that it was natural for her to sharpen the ideas of the book and make it more readable and accessible to people outside of linguis-

tics. Linguist Terje Lohndal started working on this approach to language analysis as a teenager and first wrote to me then, beginning a long-term, fruitful correspondence; both his work and the correspondence have helped to keep me honest in this book. However, these days publishers use advanced, digital facilities for their editorial work, which can be a challenge for those of a certain age. My standard response is to look for somebody under the age of thirty five. The young person who helped me navigate those challenges was Kate Kelso, who was masterful. I am enormously grateful to the wide-ranging intellects of Elan Dresher, Bill Idsardi, and Barbara Lust; they read the whole manuscript and gave rich commentary and much helpful advice.

It was a particular pleasure to be invited to sketch the ideas of this book at BLCU in 2018 at the inauguration of China's first department of linguistics, a major development for Chinese linguists, who build on hundreds of years of thinking about language. There I argued that studying language can be a good vehicle for teaching undergraduates about scientific investigation quite generally, as we did in the early days of the Department of Linguistics at the University of Maryland, which I helped to found in the early 1980s. Given the way our field has developed, researchers can lead students to generate productive, innovative findings early in their careers, without expensive equipment and without having to develop full command of a discipline like history, biology, or nuclear physics. Instead, students may take advantage of the laboratory in their heads, their knowledge of forms of Chinese in Beijing and of English in Maryland. The dynamism of Chinese academic life and the recent history of work on Chinese syntax will bring exciting developments, and I would like to think that this book might assist those efforts by exploring new ways of thinking about language acquisition and variation.

Work on the book turned into a family affair: I was helped by my sister-in-law, Sue Lightfoot, who prepared the index, and my daughter, Heidi Lightfoot, Founding Director of Together Design, who worked with MIT Press to produce the cover design.