Syntactic development

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For C. M.,
who learned two languages while I was trying
to finish this book

Acknowledgments

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I

The Study of Language Acquisition

Children master the intricacies of their native language before they are able to tie a knot, jump rope, or draw a decent-looking circle. This achievement is so routine and so expected that most people rarely give it a second thought. But its significance has not been lost on linguists, who are only too aware of the complexity of language and of the mysteries that surround its acquisition.

A central tenet of virtually all research on language acquisition is that the ability to use language stems from the fact that, as children, all normal human beings acquire a grammar—a cognitive system that determines the relationship between form and meaning in all possible sentences of their language. As it is currently understood, a grammar includes two major components (see table 1.1). The first is a lexicon or 'dictionary', which serves as a repository for information about the properties of individual words (e.g., their form and meaning, the types of elements with which they can or must occur, and so forth). The second component of a grammar consists of various systems of principles that regulate the language's sound pattern (phonology), the structure of its words (morphology), and the form and interpretation of its sentences (syntax and semantics). Working together, the different components of the grammar determine that in a sentence such as *Sue's mother purchased several pictures of herself,* the word *mother* will be more heavily stressed than *Sue* (setting aside the possibility of contrastive intonation); that the verb *purchase* takes both a 'subject' (corresponding to the purchaser) and a 'direct object' (corresponding to the thing bought), that the subject precedes the verb; that the verb precedes its object and that together they form a structural unit; that the pictures depict Sue's mother (not Sue); and so forth. Much of this information can be represented in the form of a tree structure, as depicted in (1). (Various details, such as the internal structure of the NPs, are ignored here; indexing represents coreference.)
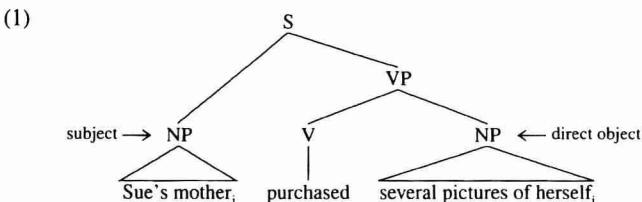
(1)

$$S$$

subject → NP, V, NP ← direct object

Sue's mother$_i$ purchased   several pictures of herself$_i$

Table 1.1 The Grammar

Lexicon	Principles
Information about words	Phonology
	Morphology
	Syntax
	Semantics

There is good reason to think that "grammar" rather than "language" should be the focal point of research on linguistic development. As suggested several decades ago by Bloomfield (1926:155), a language is "the totality of utterances that can be made in a speech community." Since no one could ever learn such an infinitely large set of utterances, it follows that a language per se cannot be acquired. What can be acquired, however, is the finite grammar that allows members of a speech community to understand and use their language. Although I will continue to use the term 'language acquisition' for the sake of convenience and tradition, this book is concerned with the emergence of a particular cognitive system (i.e., the grammar), not a set of utterances. More specifically, it focuses on what is known about 'syntactic development', the (subconscious) process whereby children become able to form sentences from words and other smaller structural units. Because of this focus, it will often appear that I am using the terms 'grammar' and 'syntax' interchangeably; in fact, of course, the syntactic system makes up only one part of the grammar that is the product of the language acquisition process.

1. The Acquisition Process

Traditionally, the study of grammar and the study of language acquisition have been conducted more or less independently of each other. This contrasts with the view adopted here, which is that the two types of research can and should be pursued as part of a single joint enterprise. No grammatical theory can be considered satisfactory if there is no plausible account of how the grammars that it posits for particular languages emerge in response to experience. (N. Chomsky 1965:25 introduces the term 'explanatory adequacy' to describe this criterion.) By the same standard, no theory of language acquisition can be considered adequate if it cannot account for the emergence of the type of grammar believed to underlie adult linguistic competence.

The recognition that the end product of 'language acquisition' is a grammar does more than simply establish a point of principle. It also shapes and informs the study of language acquisition by shedding light on the nature of the system that is acquired and the sort of data to which learners do—and do not—have access. Let us briefly consider each point in turn.

THE FINAL SYSTEM

It is generally acknowledged that the mature grammar for any human language is a complex and abstract system. There is ongoing controversy about how to describe many parts of this system, and various phenomena continue to resist insightful analysis altogether. This is not to say that the existence of a grammar is in doubt, or even that its properties cannot be deduced with reasonable certainty. Quite to the contrary, there is a near-consensus that (the syntactic component of) the grammar for any human language must include both a set of categories such as 'noun' and 'verb' and a set of operations that can combine these categories to create an unlimited number of sentences with a particular linear and hierarchical organization. In addition, a grammar must contain principles that regulate phenomena such as pronoun interpretation (*him* can refer to John in *John's friends praised him,* but not in *John praised him*) and the relationship between a 'gap' and the 'displaced' element (e.g., a *wh* word) with which it is associated (compare *Who did you see a picture of __?* with **Who did a picture of __ frighten you?*).

From the point of view of language acquisition, then, it follows that we must find a way to explain how language learners discover categories such as 'noun' and 'verb', how they determine the precise architecture of the phrases formed by combining these categories, and how they come to have particular constraints on pronoun interpretation and gap placement. In each case, the more we know about the particular component of the mature grammatical system, the more precisely we can formulate hypotheses about the mental structures and types of experience that are necessary for its development.

THE DATA

One of the more puzzling revelations of the grammar-oriented study of language acquisition has to do with the type of linguistic 'data' available to children. When linguists set out to discover the grammatical system of a language that they do not speak, they invariably rely on so-called 'grammaticality judgments' — assessments by native speakers of the acceptability and interpretation of various real and hypothetical sentences. Imagine, for example, that a group of Chinese linguists studying English observed that some question structures contain two *wh* words. In order to determine whether all combinations of *wh* words are possible, they would prepare a list of hypothetical sentences such as those in (2)–(6) and solicit judgments from native speakers of English.

(2) Who saw what?
(3) Who gave a gift to whom?
(4) Who went where?
(5) ?*Who went when?
(6) *Who went why?

In order to test subsequent hypotheses, they would make up further sentences and check their status, continuing in this manner until they had arrived at a successful analysis.

Children learning a first language cannot proceed in this way, however. As we will see in more detail in part II of this book, young language learners neither request nor receive judgments about the grammaticality of actual or hypothetical sentences in their language. Their sole source of information about the grammar that they must acquire is the normal, day-to-day use of language by those around them. Although no linguist could construct a grammar on the basis of such restricted data, children somehow succeed in doing just this.

2. The Acquisition Device

As we have just seen, language acquisition involves the emergence of a cognitive system containing categories and principles of a particular type. Much of this system exists subconsciously and is acquired without deliberate effort at an early age. More surprisingly, this system develops even though children do not have access to the type of evidence that bears most directly on its properties (i.e., grammaticality judgments). Taken together, these facts suggest that the human brain must contain a mechanism that is somehow especially suited for grammar-building and that is available from very early in life. For the sake of convenience, let us refer to this mechanism as the **acquisition device.**

The acquisition device can be thought of as a 'function' from experience to a grammar. That is, as depicted in figure 1.1, it takes as its input the type of experience that comes from being exposed to the language in one's environment and gives as its output a grammar that permits productive use of that language. (For early statements of this idea, see N. Chomsky 1966:20 and McNeill 1966:39; for some discussion, see McCawley 1976:171.)

In general, the study of the acquisition device is oriented around two major research themes, one involving **learnability** and the other **development.** The learnability issue, also called the 'logical problem of language acquisition', is concerned with the type of acquisition device needed to construct a grammar in response to the experience that is available during the first years of life. The study of development, on the other hand, focuses on the step-by-step emergence of grammatical patterns and the types of errors that may occur prior to the attainment of mature linguistic competence (e.g., *Daddy goed* and *Me want that*).

experience $\longrightarrow$ [acquisition device] $\longrightarrow$ grammar
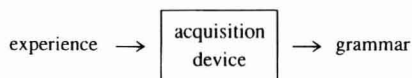
FIGURE 1.1 The Acquisition Process

These two research themes have often been pursued independently (for some commentary on this state of affairs, see Bowerman 1985:1259–60, 1987:443; and L. Bloom and Harner 1989:207–8). However, both lines of inquiry are in fact closely related, since each seeks to understand the acquisition device, although from somewhat different perspectives. Study of the learnability problem provides clues about the internal structure of the acquisition device, the type of grammar that it yields, and the type of experience that it requires. In contrast, investigation of developmental phenomena yields information about the real-time operation of the acquisition device in response to children's day-to-day experience with language. Put another way, learnability research focuses on *how* the acquisition device does what it does, while developmental research focuses on *when* it does it (and why).

Given their different goals and orientations, it is not surprising that the two approaches to language acquisition draw on very different types of data. The study of the learnability problem tends to make very limited use of data from child language, relying instead on argumentation involving the relationship between the types of experience available to the acquisition device and the principles of adult grammar that it must eventually produce (see chaps. 12–14). In contrast, research into development draws very heavily on child language data both from naturalistic studies and from experimental research (table 1.2).

Naturalistic studies of child language involve the examination of recordings and transcripts of children's spontaneous speech that have been collected over a period of months or even years. In contrast, experimental research attempts to assess children's knowledge of particular structure types by having them carry out a particular task (usually involving comprehension, production, or imitation). Experimental work is generally cross-sectional, involving the comparative study of different groups of children (say, 2-year-olds and 4-year-olds) at a particular moment in their development. On the other hand, naturalistic studies tend to be longitudinal in that they track the development of a particular child (or group of children) over a period of time.[1]

Each type of study has its advantages and disadvantages. Naturalistic studies are able to investigate speech in an uncontrived setting and are ideal for examining the step-by-step progression of the acquisition process—as manifested, for instance, in the emergence of tense inflection or pronominal case, changes in the rate of subject deletion, or the increase over time in the average length of children's sentences (so-called 'mean length of utterance' or **MLU**). However, this type of study is limited by the fact that certain structures (e.g., passives or relative clauses) occur infrequently in spontaneous speech and are thus difficult to investigate using data of this sort. Moreover, because of their longitudinal character, naturalistic studies are sometimes impractical due to the time required to collect

Table 1.2 Principal Methods of Data Collection

Method	Comments
Naturalistic (usually longitudinal)	
Recording & transcribing	Requires a substantial long-term commitment of time and effort on the part of the researcher; because only a small amount of the child's speech is recorded, infrequently used words or structures may not show up in the sample; speech may be difficult to interpret when it is being transcribed, and (unless videotaping is used) the precise context in which sentences are uttered may be difficult or impossible to reconstruct.
Diary study	Has the advantage of being carried out by the caregiver, who is best able to interpret what is being said and who hears more of the child's utterances than anyone else; best suited for the study of vocabulary and simple structures that can be identified by people with no professional training; there is some reason for concern about the reliability of diary reports (e.g., Pine 1992).
Experimental (usually cross-sectional)	
Comprehension	The most commonly used procedure (having the child act out the meaning of the sentence) requires considerable processing and planning beyond the simple interpretation of the sentence; these complications may be reduced by techniques that test comprehension by having the child match the sentence with a depiction of its meaning (see Cocking and McHale 1981; Hirsh-Pasek and Golinkoff 1991). At best, comprehension tests provide information about a sentence's interpretation; they usually cannot shed light on whether children think a particular pattern is well-formed (grammatical).
Imitation	Care must be taken to ensure that children are using their grammatical knowledge rather than just short-term memory to perform the task (see Slobin and Welsh 1973; Lust, Chien, and Flynn 1987; and Masterson 1993 for some guidelines); imitation can provide insights into how children perceive and analyze sentence structure, but it offers little information about meaning (O'Grady, Cho, and Sato 1994).
Production	Many structures are natural only in specific contexts which may be difficult to reproduce in experimental situations; children's performance on production tasks often lags behind their ability to comprehend and imitate particular structures.

and transcribe tape-recorded data. (This problem is alleviated somewhat in the case of English and a few other languages by the availability of previously collected and transcribed data from various sources, including CHILDES—the Child Language Data Exchange System; see, for instance, MacWhinney 1991.)

Experimental studies allow investigators to focus on particular phenomena, including structures that may occur rarely in spontaneous speech, and to work with relatively large numbers of subjects at once. However, this flexibility comes

at some cost. Because of its cross-sectional design, experimental research cannot document the progression of individual children through developmental stages, although tentative proposals about the existence and nature of such stages are sometimes based on this type of work.

A limitation common to all methods for the study of syntactic development is that they are likely to underestimate subjects' actual competence: the fact that children fail to produce or comprehend a particular structure or a particular sentence type in an experiment does not allow one to conclude with certainty that they lack the relevant grammatical knowledge. A variety of extraneous factors—including inattention, nervousness, processing limitations, and a failure to understand what is expected—can interfere with children's ability to use language to the full extent of their grammatical capabilities. It is therefore perhaps not surprising that the evolution of ever more refined techniques of data collection in recent years has resulted in consistent downward revisions in estimates of the age at which various milestones in syntactic development are achieved.

In subsequent chapters, we will have occasion to consider concrete instances of the problems and shortcomings of the various types of data collection in more detail. For now it suffices to note that despite these limitations, work on each of the two major research themes in the study of language acquisition (i.e., learnability and development) has yielded important results in recent years. It is the goal of this book to examine these results in as comprehensive a manner as possible, with an eye to shedding light on the structure and operation of the acquisition device. Where possible, findings from different studies are brought together to give a synthesis; where this is not possible, note is made of the contradictory results and unsolved problems that must await future resolution.

Part I of this book is devoted largely to a survey of the developmental facts, focusing on the steps or 'stages' that language learners pass through on the way to acquiring the grammar of their language. These chapters discuss phenomena that are by all accounts central to the syntax of human language—category assignment, word order, passivization, question formation, relativization, and pronoun interpretation, to name a few. The emergence of these phenomena is considered in approximate chronological order, beginning with children's first primitive utterances and ending with complex syntactic patterns of various sorts. To the extent possible, these chapters present a historical overview of the relevant research literature and characterize the known facts in a relatively theory-neutral way. Although explanatory proposals are considered from time to time, no general theory of development is put forward, and only quite conservative assumptions are made about the grammar whose emergence is reflected in the developmental data.

In contrast, part II of this book is intentionally theoretical in orientation. The learnability problem is considered for the first time, and development is reconsidered from a theoretical perspective. The focus of these chapters is on the internal structure of the acquisition device, the type of experience that it requires to operate successfully, and the type of grammar that it ultimately yields. Different theories of learnability and development are considered and evaluated in light of the data described in earlier chapters.

Despite the technical nature of much of the work on syntactic development, every effort has been made to ensure that this book will be accessible to readers who have no advanced training in either linguistics or psychology. In general, the discussion assumes only an introductory course in linguistics, and concepts that may not be familiar to the average reader are explained as they are introduced. (In addition, a glossary provides brief definitions for key terms and abbreviations.) The chapters are intended to be read in sequence, since later parts of the book often presuppose familiarity with material covered in earlier sections.

3. Some Limitations

The literature on language acquisition is enormous, thanks in large part to the intense research activity of the past two decades. It goes almost without saying that no book can purport to provide a comprehensive treatment of the field. In order to limit the scope of the present study, several difficult choices had to be made.

First, it was necessary to choose between a detailed study of the acquisition of a single language and a much more general overview of acquisition phenomena in several different languages. (The ideal, of course, would be a detailed study of many different languages, but this is simply not a practical option—in part because of gaps in the research literature and in part because of limitations on time and space.) As readers will quickly discover, this book draws predominantly on research studies involving the acquisition of English—this being the language for which the currently available data provide the most complete picture of syntactic development. Occasional reference is made to the acquisition of languages other than English when relevant information is available, but no attempt is made to survey this part of the acquisition literature in a systematic way.

Second, it was necessary to limit the investigation to a set of syntactic phenomena whose acquisition can be described in a coherent and relatively self-contained way. It was therefore decided to exclude from the domain of this book most issues pertaining to lexical properties of words (meaning and subcategorization), morphology, and discourse even though these phenomena clearly play a role in sentence formation. The resulting picture of the language acquisition process will therefore of necessity be incomplete, but hopefully not distorted.

Third, because of the large number of studies on syntactic development, it was necessary to be somewhat selective in reviewing the relevant research literature. In part for practical reasons, it was decided to focus on studies that have appeared in the published literature. (In addition to their accessibility, these studies have the advantage of having been filtered through the peer review process.) However, where warranted, occasional reference is made to research that has appeared only in dissertations and conference presentations.

Still another difficult decision had to do with the choice of theoretical framework. A good deal of work on development is formulated within the grammatical framework known as 'Government and Binding (GB) theory' (also called 'Principles and Parameters theory'). However, since the findings of these studies do not in general entail the correctness of GB theory (or any other framework), I thought it advisable to restate them in more 'theory-neutral' terms. I have followed this policy as closely as possible throughout my survey of the developmental facts, keeping formalism to a minimum and employing syntactic representations that are compatible with (or at least easily translated into) a variety of contemporary theories.

The theoretical discussion that dominates the second part of this book requires a different approach, since many of the proposals considered there are inextricably linked to GB theory. In order to accommodate this fact, I have devoted an entire chapter to a review of work on the learnability problem within this framework. However, a subsequent chapter outlines various alternatives to the GB approach to learnability, although these alternatives are considerably less developed and less encompassing in their scope.

Within the limitations just outlined, the discussion of syntactic development contained in this book seeks to be as comprehensive and objective as possible. Facts and proposals from a wide variety of sources are brought together and integrated in an attempt to provide a coherent outline of how the acquisition device is structured and how it operates. Of course, important gaps remain, and many of the proposals I make may prove controversial, but perhaps it is not too much to hope that this exercise will contribute to further advances in the field of language acquisition research.