8 How children learn language

Introduction to Part III

Part II primarily addressed the Argument for Mental Grammar, looking at the principles for language use that mature speakers carry around in their heads. However, we constantly kept in mind the Argument for Innate Knowledge, and we therefore made an effort to separate the aspects of mental grammar that have to be learned from those that are given to the language learner in advance.

The evidence we drew on in Part II came from the structure of mental grammar itself, in two ways. First, from the range of possibilities for grammatical features across the languages of the world, we get an idea of the menu presented by Universal Grammar. Second, the fact that grammatical structure is so abstract with respect to speech (and sign) shows us that language acquisition has to go far beyond just memorizing and reshuffling inputs one has heard. Much of the organization has to come from inside the brain.

We will now go into more direct evidence for the Argument for Innate Knowledge, looking at the process of language learning in normal children (this chapter) and in a wide variety of more unusual cases (Chapters 9 and 10). We will also look at different kinds of language loss due to brain damage (Chapter 11). The goals throughout will be (1) to figure out which aspects of language are learned and which innate; and (2) to factor language ability into the parts specific to language and the parts which can be accounted for by more general intelligence.

In turn, the point of all this is to establish a baseline in terms of which to think of human nature. If language consists of this complex mix of learned and innate, special-purpose and general-purpose, and if in language learning the effects of nurture are strongly guided by nature, then there is reason to look for similar organization in other abilities as well.

Basic stages of language acquisition

Let's start looking at language learning in terms of the simplest observable phenomena—what babies and young children say. Of course, the earliest vocalization is crying, which, as any parent will tell you, comes in many varieties. Though it obviously communicates, it isn't language by any means. The kind of information it conveys is more akin to tone of voice: essentially, emotional state.

Sometime in the first couple of months, babies develop a kind of vocalization usually called "cooing": "goo" or "gmp" sorts of sounds, or quiet whooping. This gradually gives way at about six months to a stage called "babbling," in which the baby makes a large range of meaningless sounds, often forming strings of syllables; Frequently, babbling children even make sounds that aren't present in the language of the environment.

The consensus on babbling is that it is basically a stage in which the baby is playing with its vocal tract, with no particular linguistic intention. Even deaf babies are observed to babble; on the other hand, not all babies do it (my older daughter didn't, to my deep disappointment). Still, there are hints of proto-linguistic behavior. Babies often babble in response to being spoken to, suggesting that they are catching on to the idea of taking turns speaking in conversation. And a couple of months into babbling, the strings of sounds begin to be uttered with intonation patterns characteristic of speaking, so that the baby almost seems to be talking.

As this period progresses, the baby's phonetic output gradually comes to be "tuned" to the language of the environment—and deaf children tend to fall silent. Ruth Weir and Jean Aitchison have reported research that demonstrates this tuning. Recorded babbling of an American, a Russian, and an Arab baby was played to mothers. The American mothers could often identify the American baby, the Russian mothers the Russian baby, and the Arab mothers the Arab baby. But none of them could distinguish between the remaining two babies. So the babies, even though they weren't saying anything meaningful, were evidently making noises that sounded like the language they had been hearing around them.

(Incidentally, deaf children exposed to sign start "babbling" with their hands, in a way very much parallel to spoken babbling, experimenting with handshape and movement.)

Sometime between ten and twenty months (with girls tending to be on the earlier side, boys later), babies really start to talk, albeit in single-word utterances. The words in their vocabulary include names

like "Mommy" and "Cindy," object words like "spoon" and "car," pointing words like "that," action words like "eat" and "push," properties like "hot," directions such as "up" and "down," greetings like "bye-bye," and, of course, "no." There are no function words like "a," "is," or "to"; there are no inflections like plural and past tense. The child's vocabulary may grow to fifty or seventy-five or a hundred words over a period of six months or so. You can list the words your child knows, and each new word is a milestone: "Hey, Beth said 'turtle' today!" Despite the limitations of this one-word stage, a surprising amount gets communicated this way.

After a few months of this kind of talk, perhaps at two years of age or a little before, children start to put together two-word utterances, things like "Mommy sock," "drink soup," "no eat." Even though there is nothing like an adult grammar yet, we see fairly consistent use of word order, in a sort of stripped-down version of adult order. For instance, a child at this stage won't say "Mommy throw ball," because it's too long. But we may well hear the more reduced versions "Mommy throw" and "throw ball"; while the opposite orders, "throw Mommy" and "ball throw," are unlikely.

Around the same time, all of a sudden the child's vocabulary takes off. The parents can't keep track anymore of the words their child knows. The standard estimate is that a five-year-old knows on the order of 10,000 words. This means that between the ages of two and five (three years, about a thousand days), the child has averaged ten new words a day, or close to one every waking hour! Since a word may take a period of time to master, this also means the child is probably working on dozens of words at a time.

After maybe another few months of two-word utterances, we begin to see a steady growth of grammatical complexity along with vocabulary growth. The child starts constructing gradually longer and more complex sentences, and function words and inflections begin appearing. By age five the child is speaking with a very good approximation to adult grammar, though there are numerous wrinkles to be ironed out and complexities to be added by age ten or so. (And vocabulary learning continues throughout life, though at a less frenetic pace.)

I should add that this is the standard story, and there is a fair amount of variation, including anecdotes of children who don't speak at all till they are three or four, then start talking in whole sentences. (On the other hand, if *my* child didn't talk by the age of three, I would start getting worried.)

It is also worth mentioning that children who are exposed to a

second language—say because they have moved to a new country—don't take as long to learn the new language. They tend to become relatively fluent within a year or so. This suggests that some of the protracted stages of language learning from ages one to four or so should be attributed to maturation of the brain—growth in the ability to learn language—rather than to the inherent difficulties of the language being learned.

In Chapter 3, we pointed out how little of this gradual growth of language ability can be attributed to teaching. To be sure, adults and even older children will teach individual words. (But one an hour? I doubt it.) In addition, adults tend to speak to children more clearly and in simpler sentences than they use with other adults. So to some extent, children don't have to deal with the full daunting complexity of the language all at once.

We also noted, though, that children get very little grammatical correction, and are liable to ignore or resist correction when it does take place. Here's another famous example, cited by Martin Braine.

CHILD: Want other one spoon, Daddy.
FATHER: You mean, you want the other spoon.
CHILD: Yes, I want other one spoon, please Daddy.
FATHER: Can you say "the other spoon"?
CHILD: Other . . . one . . . spoon.
FATHER: Say "other."
CHILD: Other.
FATHER: "Spoon."
CHILD: Spoon.
FATHER: "Other spoon."
CHILD: Other . . . spoon. Now give me other one spoon?

This shows that the child is not just imitating—the imitation is, as it were, filtered through the child's own (unconscious) version of the language. In other words, we are seeing evidence of a mental grammar—maybe not the same as an adult's, but a mental grammar nonetheless—which governs the child's use of patterns.

So the real problem of language acquisition is not just to describe the child's behavior, but to induce from this behavior the nature of the unconscious grammar that guides it, and to discover how this grammar changes as the child matures. In the rest of the chapter, I'll describe some of the things we can find out about the development of the grammar. As usual, I'll only be able to skim over a few representative phenomena, in the hope of giving the flavor of the results of a flourishing body of research.

Children know more than they say

Impressionistically, one-and-a-half-year-old children understand an amazing amount of what you say to them—even if their speech consists only of one-word utterances and their spoken vocabulary contains only fifty words. That is, their comprehension is way ahead of their production. Some rather simple experiments show this in striking fashion.

First, consider their phonology. Where I have written whole words in transcribing babies' utterances above, I was not showing you any of the simplification that they wreak on the pronunciation. Typically clusters of consonants may be simplified ("spoon" is pronounced "poon") and final consonants may be omitted ("bus" is pronounced "buh"). The articulation of consonants may be altered to make them more like other consonants in the same word: "truck" may become "guck," where "g" and "k" are articulated in the same place in the mouth.* Some of the simplification is undoubtedly due to lack of adequate motor control of the vocal tract, since the child can be shown to perceive the adult sounds. For example, a child who says "guck" for both "truck" and "duck" won't have any problem distinguishing trucks from ducks on demand.

There are other cases that are even more intriguing. The linguist Neil Smith writes that his son consistently substituted "f" for "th," so that "thick" came out "fick." But it wasn't that he couldn't pronounce "th," since at the same time he used "th" instead of "s," so that "sick" came out "thick"! So there is evidently some system in place that goes beyond motor control alone.

A final complication is that children often don't hear what they're doing. If you deliberately pronounce a word the way your child does, he or she will get mad at you and tell you to say it right. If you tell your child to say "duck", not "guck," most of the time you'll get "guck" and a blank stare. Perhaps it's like not being able to hear your own accent. The point is, even at beginning stages, the child seems to grasp much of the sound system of the adult language, but maps it into motor control in an eccentric or degraded fashion.

* This is the standard account of why "truck" may be pronounced "guck." Recent research by Clara Levelt, examining a large number of such mispronunciations by children learning Dutch, suggests that it is actually the vowel that affects how the consonants are pronounced. On Levelt's account, vowels made in the back of the mouth, such as the "uh" in "truck," tend to pull adjacent consonants back to "g" and "k"; vowels made with lip-rounding, such as "oo," tend to change adjacent consonants to "b" and "p," which are also made with the lips.