

Draft Copy of Preface, Chapter 1, and Chapter 2 of James Luberda's Cognitive Science-Inflected Literature and Composition Textbook

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Preface: A Cognitive Approach to Composition and Literature

Composition

Whether you are student or instructor (or both), you are no doubt familiar with the typical textbook approaches to the teaching of composition. The most popular textbooks for use in college-level writing instruction offer a combination of:

- formal exercises in composing thesis statements,
- a taxonomy of various formula essays (descriptive, process, argumentative, etc.), **or**, alternatively, a selection of published essays, often on a particular theme, which are to serve as models and/or material for students to write about
- and "grammar," sometimes called "style," appearing often in the form of examples and exercises. Sometimes this element is consigned to a separate handbook.

What nearly all of these textbooks assume is that writing instruction consists largely of training students to formulate an argument, find evidence for it, and deploy that argument and its supporting material in one of a few standardized forms, of which the five-paragraph essay is the most well-known, especially in precollegiate instruction. In addition to this essay model, such textbooks further assume that there is a single, identifiable standard known as "good writing" that is attainable through these methods. Linguistically naive, they fail to provide any context for writing, for the differences between speech and writing, for the social dimensions of language use, or the changes in language through time. Further, they fail to account meaningfully, if at all, for the difficulties that students face in attempting to achieve this "good writing" that the various formulae promise to deliver. For all the talk of "process" that some of these texts engage in, they seem largely uninformed of the actual processes involved in language use and development, and instead objectify a few identifiable formal writing tasks (prewriting, outlining, revision) to be done in a predetermined order.

In sum, students come away from these textbooks, and the courses they shape, with a vague notion of what counts as a "good" essay in an English class (and which they are assured counts as a good essay in other domains as well), what counts as "evidence" in an English class, and the belief that writing is largely a matter of form and the memorization and implementation of certain rules that are not only obscure as to purpose, but are wholly without origin--that is, they are given, not made, possibly by some hypothetical Greek-styled "grammar God." Writing remains a mysterious activity, and it is no wonder that so many come to dislike it, for to the outsider, the system appears monstrous, unapproachable.

The present textbook is built from an entirely different foundation. The guiding assumption behind this textbook is that an advanced, college-level understanding of composition and the truly advanced writing skills that go with it demand a more informed awareness of the nature of language and the construction of meaning. Conventional textbooks operate upon the assumption that writing skills are developed primarily through practiced imitation of a limited number of accepted forms. The current text, on the other hand, takes advantage of recent research into the learning process that suggests true expertise is more readily acquired not through practiced imitation alone, but through conscious awareness and direction of one's own problem-solving processes. What makes

this a "cognitive" approach, as opposed to the more traditional kinds described above, is its emphasis on the thinking processes of the mind as it receives and produces linguistic communication. In a similar vein, this textbook emphasizes the need for students to understand the choices they make in writing, to understand the origins and functions of the conventions that are typically associated with what people identify as good writing. The goal, above all, is to get students to be conscious, informed writers and language users rather than passive imitators of form and taste.

As should be clear by now, the kind of composition discussed by this textbook does not traffic in thesis statements and "grammar" workshops. For some, this will come as a relief; for others, especially those who have become skilled at delivering the conventions of formal writing, this may prove threatening, as it is likely to contradict or overturn much of what you have previously been taught. This material will be challenging. It may not always seem to bear directly upon your own writing efforts, but that has more to do with the way composition has been taught, rather than the absence of a relationship between what this textbook addresses and your writing and speaking experience.

Literature

This textbook is not unusual in its treatment of composition alone; as it is written to be used in a combined composition and literature course, it also addresses literature, and in a similarly unconventional way. For the purpose of comparison, most popular survey-course literature textbooks may be described as follows:

- They are largely anthologies of "literary" texts, broken up into the typical categories of short fiction, poetry, and drama
- The introductory material incorporated in these books assumes that the value and purpose of literature is self-evident, and the student is merely to read, admire, and discuss the meanings of the works selected for class.
- Editorial material covering literary forms and convention is usually present in varying lengths.

When the conventional literary anthology is combined with the conventional composition textbook, the result is supposed to be a textbook that is about composition *and* literature. However, the hallmark of these texts is the disconnect between the writing that students are asked to do (i.e. the thesis-driven argumentative essay) and the writing that they are asked to read (poems and the like). The present textbook, however, bridges this gap through the same basic cognitive and linguistic framework used to present more general issues of writing and communication. That is, it simply presents literary texts as a special case of the more general phenomenon of written and spoken language. All of the same cognitive and linguistic features exemplified by literary texts are present in everyday language, including the writing that students produce. By identifying these common features, literary texts are de-mystified, and made more accessible as a result. Students can see how they participate in, and are constrained by many of the same aspects of cognition and language use that govern writing they are more familiar with.

Similarly, the treatment of literature in this textbook does not naively assume that literature is a self-evident concept, or that the things called literary texts are inherently pleasurable to read. Most students come into college English classes with little or no idea why they are studying literature; some may have been given the vague Arnoldian epithet

“the best that has been thought and said,” or universalist claims that “it speaks to us all,” but even these pseudo-explanations only beg the question: why is it that the “best” thoughts which “speak” to all of us are often written in verse? The following chapters are intended to rectify, in part, the absence of any useful explanation for why categories of texts known as “literature” and “poetry” are worthy of formal study. This textbook is also predicated upon a particular assumption about the value of literary texts: their cognitive value in providing a venue for language that highlights the conventions and constraints of everyday language use through foregrounding, extending, and violating them. As such, literature will serve both as a subject for investigation as well as a source of examples and insights into language and the operations of the mind. Many writers have been investigating the same problems as scientists for hundreds, even thousands of years.

Purpose

The goal, then, in the chapters that follow, is to contextualize composition and literary study within the framework of human communication, identifying them as special cases of a more general phenomenon. Part of this goal is achieved through materials derived from a larger intellectual movement in the direction of what is known as “cognitive science.” This appellation marks the collaborative efforts of psychology, philosophy, comparative anthropology, evolutionary biology, and neuroscience, among other fields, to recast the whole sphere of human activity within an evolutionary framework that assumes all human behavior may be better understood as the result of a complex of interactions between a mind (with a genetically coded base) and its environment (social and otherwise). It is universalist in the sense that it assumes certain fundamental biological characteristics that are determinant across all human beings, yet it is relativist in that it examines outcomes in terms of the social environment in which an individual human being finds itself.

Due in part to the influence of cognitive science, you will find that many familiar topics concerning writing and thinking are couched in terms of “problems” and “problem-solving,” with the idea that we utilize “strategies,” consciously and unconsciously, to solve problems. While this framework does not capture all of the issues involved in writing, it provides a new, and possibly more familiar angle from which to approach writing tasks. Also, as suggested earlier, one of the other purposes behind this textbook is to assist you in developing *metacognition*, that is, a conscious awareness of your own mental processes as you read, think, and write. By learning to consciously attend to the ways in which you use language, the attitudes, assumptions, and patterns inherent in your own speech and writing, you improve your ability to intervene and take more control over these influences.

Without a doubt, the ambitions recorded here are great, especially given the limits of a single semester and the quantity of writing usually expected of a composition course. Nevertheless, to ignore this necessity is to impoverish students of a deeper, and truly college-level understanding of writing. I don't expect that all of this material will be covered in class, by any means, if even all of it is assigned; part of the impetus for writing this text was my desire to have my students familiarize themselves with background issues that I did not want to spend too much, if any, class time directly addressing. I wanted it available as an accessible resource. In spite of the apparent complexity of its subject matter, this textbook has been tested and designed for use in any college-level

composition course. It would also be an appropriate honors-level or advanced composition text, but that is not its intended use.

Finally, this textbook will also be more coherent than competing language-themed readers that simply compile a list of readings/excerpts that occasionally contain redundant information or lack the connections that produce a coherent picture for teacher or student.

Organization

The introductory chapter, "Language and Thought," begins with a question that is essential to any serious understanding of the writing process: what is the relationship between language and thought? After this preliminary investigation into how we turn the things we think into the things we say or write, Chapter 2, "On the Origin and Nature of Language," explores what we know about language in the broad panorama of human history as well as the individual histories of every human being.

[Additional material omitted at this point]

Chapter 1: Language and Thought

Writing very clearly involves the use of two of our human abilities: our ability to use a language, and our ability to think.

Although it is obvious that both language and thinking are involved in writing, what is not so clear is the relationship between the two. For example, would it be correct to say that we translate our thoughts into words? Or do we naturally do all our thinking in words? The latter idea, that we think in words, might seem to be an accurate picture of what goes on in the mind, especially after a little self-introspection. Take a moment right now to examine your thoughts; do they appear as unspoken words and sentences to you? Did you begin by asking yourself the question, "Okay, what *am* I thinking?" Think about other situations. For example, when making a decision, who doesn't frame the problem in unspoken but imagined sentences such as "If I do X, I can't do Y; but I really want to do X"? Further, don't we often answer (in our minds) our own internally posed questions? In addition to the sample question cited above, consider this example:

Should I begin writing my paper now? Nah, I'll do it later.

If this sounds familiar, you're not alone, though not merely because you procrastinate. The Greek philosopher Plato proposed some two thousand years ago that thinking was more or less "the mind having a dialogue with itself," a dialogue that appears to be quite (mentally) audible. Clearly, Plato's observation suggests that this mental dialogue is not a peculiarly modern phenomenon. Right now you are probably holding several thoughts in mind, all of which appear to be sentences of some kind, many of which are probably responses to each other. Perhaps "What does this have to do with writing?" is among them; or "I don't understand what is going on here," a thought that you ought to express at some point in class. In any case, we seem to have some handy internal evidence that we do all of our thinking using words.

Yet this can't possibly be true. For example, recall the last time you drove a car. Did you form sentences equivalent to "Now I'm going to turn" and "I am stopping now" in your mind every time you did either? Presumably not. Yet would you say that you weren't "thinking" in some sense as you navigated to your destination? Again, probably not. Indeed, if you think for a moment about all of the daily activities you engage in that you would never imagine requiring mental sentences to perform, it becomes fairly clear that at least some kinds of thought are not only possible without words, but in fact would be hindered by them. Just think how long it would take to drink a glass of water if you had to form sentences expressing each of your actions prior to performing them: "I am getting a glass. Now I am holding a glass. I am bringing the glass to the faucet. I am turning on the faucet. I am waiting for the glass to fill. I am turning off the faucet. I am bringing the glass to my mouth. I am opening my mouth . . ." and so on.

Thoughts on Paper: A Writing Perspective

Sounds strange, doesn't it? Curiously, some writers have attempted to render the thoughts of everyday life in precisely this way. Perhaps the most famous recent author to do so is James Joyce. Joyce, however, seems to have borrowed the technique from an earlier and less-known writer, Edouard Dujardin, whose novel *The Laurels Have Been*

Cut tells the story of a young man's pursuit of a beautiful actress. One early passage in the book reads as follows:

The hour is striking, six, the hour I waited for. Here is the house I have to enter, where I shall meet someone; the house; the hall; let's go in. Evening has come; good the air is now; something cheerful in the air. The stairs; the first steps. Supposing he has left early; he sometimes does; but I have got to tell him the story of my day.

This writing technique is often called *stream-of-consciousness*, a term that suggests that consciousness, or thinking, is metaphorically a stream; both streams and consciousness run continuously, with no real end or beginning, with thoughts running one after another like water as it flows. This technique simulates on the page what the writer imagines is going on in the mind of a character. If effective, it provides the reader with a more intimate connection with that character's mind. The implication is that nothing is left out; the reader is given full access to every thought as it occurs.

This is, of course, a writing trick. The only reason that this writing style can be effective is because it relies upon the fact that to most of us, as suggested earlier, are willing to believe that our thoughts take place in words. Certainly we have no such access to any real person's thoughts; the question is, do we even have such ideal access to our own? One implication of these experiments is that writing should be much easier than most find it to be. After all, if our thoughts are already expressed in words and sentences in our minds, then why do so many people have difficulty expressing what they think? Why can't we just say or write down the words in our heads as they come to us?

Lingualism

Writers like Joyce and Dujardin are just two among many people coming from a wide range of disciplines who have an interest in resolving the question posed earlier: what is the relationship between language and thought? This question is very much at the heart of contemporary research into the mind. The connection first suggested, which is that we do all of our thinking in words, is called *lingualism*. As just observed, this hypothesis would have us believe that thought and language bear a one-to-one relationship. That is, all of our thoughts, such as we have them, are dependent upon, and occur in, language. As you might imagine, given the easy counter-examples provided above, this rather extreme characterization is no longer much believed, at least in this form. In fact, in addition to the everyday activities we perform without explicitly thinking in words, we have further evidence for the claim that thoughts can take place without words. This evidence is found in the so-called "tip-of-the-tongue" phenomenon. We have all had the experience of knowing we wish to express a particular idea or recall a name, yet being unable to call to mind the necessary word(s). It is not that the language for the idea or the name does not exist; rather, it seems as though the part of our brain that is holding the idea has somehow failed to link up with the part of our brain responsible for expressing the idea in language. Thus we say that the words are on "the tip of our tongue," a metaphor that nicely captures both the physiological basis of speech as well as the sensory structure of the tongue itself.

It is clear that the relationship between language and thought is more complex than the hypothesis of lingualism would have us believe; it is near-certain that some of our thoughts take place without words accompanying them. Yet before we leave the idea

of a one-to-one relationship (that is, every thought is expressed in words) behind, we need to look at one important idea that has much in common with this assumption: the Sapir-Whorf hypothesis.

The Sapir-Whorf Hypothesis

The idea that thoughts can only occur in conjunction with words underlies one of the more famous claims to come out of the study of language. The Sapir-Whorf hypothesis consists of two related propositions:

- 1) *linguistic determinism*: In any given language, for any given speaker, no thought is possible that does not have an equivalent expression in that speaker's language.
- 2) *linguistic relativism*: Because thought is wholly dependent upon language, different languages, which encode different ideas and ways of looking at the world, mean that speakers of different languages actually understand the world differently.

The first proposition, *linguistic determinism*, implies that our ability to think about things we already know, as well as to think about new things, is limited by our available language. That is, if we wish to think about freedom, but we lack the word "freedom," as well as all suitable equivalents, we will be unable to do so. If we lack a past tense for our verbs, as well as all other markers to indicate time past, we can't talk about (or think about) the past. Indeed, imagine a language that lacked all reference to the past and the future; wouldn't its speakers occupy a strange world! For some time, however, this is precisely what was believed about the Native American Hopi.

Benjamin Whorf, one of the linguists after whom the above hypothesis is named, argued that the Hopi language contained "no words, grammatical forms, constructions, or expressions that refer directly to what we call 'time,' or to the past, or future, or to enduring or lasting." If this were true (and it isn't), linguistic determinism would suggest that the Hopi had no concept of time as we know it; that the absence of words concerning time would mean that they did not think about or experience time in terms of past, present, and future. The English phrases "I ran," "I am running," "I will run" would have no set of equivalent phrases in Hopi; in fact, they would be untranslatable. Now, as noted, it turned out that Whorf was quite wrong about the Hopi language; thus far, there is no known language that lacks comparable terms for time that are familiar to speakers of English and other languages. Nevertheless, if we accept linguistic determinism, the discovery of such a language would have significant implications as to how the speakers of that language conceived of life.

Although, as it turns out, the Hopi language has terms for time corresponding to those in English, the idea that speakers of different languages will understand the world differently from one another is the second proposition of the Sapir-Whorf hypothesis, *linguistic relativism*. This proposition follows logically from linguistic determinism: for, if what we can think is dependent upon the language we speak, then it would seem to reason that speakers of different languages must, of necessity, think differently. There are several famous examples that have been trotted out as evidence for language-dependent differences in thinking, but most of them have been proven false or deemed insignificant. For example, you may have heard that the Eskimo language has more words for snow than any other. Linguistic relativism, therefore, suggests that speakers of Eskimo can

actually "see" more kinds of snow than, say, a English-speaking person. It has been noted, similarly, that some cultures have fewer color words than others, suggesting that their speakers perceive an equally limited range of colors. It has been argued that speakers of Chinese have difficulty expressing and thinking about *counterfactuals*, statements that are clearly contrary to known facts (i.e. "If my grandfather were my grandmother, she'd have a beard"). Again, if this were true, it would mean that speakers of English could much more freely imagine and express possibilities contrary to reality than speakers of Chinese. And, of course, we have already noted the ill-fated attempt to demonstrate differences in the Hopi conception of time. Unfortunately, by and large, as with the case of the Hopi language, the above evidence for significant conceptual differences between languages has been overturned.

Linguistic Relativism: A Writing Perspective

Although not as grand as claims about time and color, there are clear-cut cases in which one language is clearly suited for certain kinds of expressions that another language is less capable of achieving. One of these cases involves differences between Italian and English, and may be illustrated with a look at an excerpt from the book-length poem *The Inferno*, by the Italian poet Dante Alighieri. Written in the 12th century, it is a whirlwind tour of Hell, closing with a three-headed Satan frozen in ice. Here are the first six lines of the poem in the original Italian:

*Nel mezzo del cammin di nostra vita
mi ritrovai per una selva oscura
che la diritta via era smarrita.*

*Ahi quanto a dir qual era è cosa dura
esta selva selvaggia e aspra e forte
che nel pensier rinnova la paura!*

Translating this text into English poses significant problems, because the job isn't simply a matter of mapping English noun to Italian noun and English verb to Italian verb. Rather, translation is a much more complex process, one which frequently deals with the fact that features of one language may be wholly missing in another. In the case of *The Inferno*, Dante took advantage of a feature of his native Italian to produce a unique rhyme scheme known as *terza rima*, or "triple rhyme." If you look at the rhyming words at the end of each line of the stanzas above, you will find that the scheme runs like this: aba bcb. The rhymes interlock, so that the sound that appears at the end of the middle line in the first stanza becomes the sound that rhymes the first and last lines of the following stanza. Dante continues this three-rhyme pattern through the thousands of lines that constitute his tour of Hell.

Now we come to the problem of translation: it is extraordinarily difficult to duplicate this rhyme scheme at such length in English, for where Italian is extremely rich in rhyme, English is not. Translators of the poem are forced either to fudge the rhyme scheme, imitating it only partially or not at all, or to resort to translating meanings only roughly in order to find the necessary rhyme words. We can look briefly at three different attempts to translate the first stanza:

When I had journeyed half of our life's way,
I found myself within a shadowed forest,
for I had lost the path that does not stray.

(Mandelbaum, 1980)

Midway on our life's journey, I found myself
In dark woods, the right road lost. To tell
About these woods is hard--so tangled and rough

(Pinsky, 1994)

Midway upon the journey of our life
I found myself within a forest dark,
For the straightforward pathway had been lost.

(Longfellow, 1865-7)

Although there is not the space to discuss it here, you may observe that in each case, the translators have made certain decisions concerning what counts as rhyme. Further, other issues in translation are evident: for example, are "shadowed forest" and "dark woods" really synonymous? Do these phrases conjure up precisely the same idea? How similar are the meanings of these two translations? It is cases such as these that call attention to the limits of translation as well as the differences in the ways two languages permit their speakers to express themselves.

Sapir-Whorf Today

Neither the lack of dramatic evidence for cross-language differences in concepts of time or color, nor the fact that we can clearly think of things for which we are, at least momentarily, lacking words (tip-of-the-tongue), means that the Sapir-Whorf hypothesis lacks any application whatsoever. Consider this: even if a person can and does have thoughts for which no words are available, to what extent are solitary thoughts useful? For example, most of us have experienced the frustration of trying to say something but being unable to "find the right words" to express what we mean. At that moment, how useful are those inexpressible thoughts?

Certainly, in many cases, the lack of words to express an idea simply means that we must find other ways of sharing knowledge or expressing intent. For example, if I see a brick falling squarely at your head, even if I don't have the words to say so, I can certainly push you out of the way, and use gestures as a follow-up to indicate the meaning of my actions. What do we do with more complex and abstract concepts, however, such as "respect"? How can I express such an idea *without* words? Further, what if, living in a totalitarian society, I want to express or discuss the concept of freedom? How, without words, could I do this? Indeed, how can I acquire the concept of freedom? If it cannot be expressed in words, am I to come up with it by myself?.

Such is the contention of Orwell's novel *1984*, which depicts a totalitarian society, one of whose techniques for maintaining control over its subjects is to deprive their language of words for ideas deemed contrary to government interest. This language is Newspeak.

The purpose of Newspeak was not only to provide a medium of expression for the world-view and mental habits proper to the devotees of Ingsoc [English Socialism], but to make all other modes of thought impossible. It was intended that when Newspeak had been adopted once and for all and Oldspeak forgotten, a heretical thought -- that is, a thought diverging from the principles of Ingsoc -- should be literally unthinkable, at least so far as thought is dependent on words. Its vocabulary was so constructed as to give exact and often very subtle expression to every meaning that a Party member could properly wish to express, while excluding all other meanings and also the possibility of arriving at them by indirect methods. This was done partly by the invention of new words, but chiefly by eliminating undesirable words and by stripping such words as remained of unorthodox meanings, and so far as possible of all secondary meanings whatever. To give a single example. The word *free* still existed in Newspeak, but it could only be used in such statements as 'This dog is free from lice' or 'This field is free from weeds'. It could not be used in its old sense of 'politically free' or 'intellectually free' since political and intellectual freedom no longer existed even as concepts, and were therefore of necessity nameless.

As we will see, this kind of attempt at wholesale manipulation and control of a natural human language is, in reality, destined to fail miserably. One demonstration of this may be found in grade school English and Language Arts classrooms across the U.S. today. Even with their most strenuous efforts, teachers have been unable to root out the supposed misuse of "hopefully" to mean "I am hopeful that," as in the sentence "Hopefully, my car won't be stolen or vandalized or stripped while I leave it parked here." (According to such teachers, "hopefully" is an adverb that means that one is doing something "with hope," as in, "I am working hopefully at bringing my grade point up.") If the combined efforts of all of these people in positions of authority cannot wipe out the use of one word, then there is little to suggest that even a totalitarian society could achieve much more.

Interestingly, there is one modern field in which languages are constructed in Newspeak-fashion, and whose properties do effectively determine the kinds of possible expressions: computer science. At present, artificial languages, such as those developed to program computers, cannot undergo natural change, and can only "express" functions or processes incorporated into their design. We may think similarly of mathematics, another artificial language developed expressly for solving certain problems and limiting the ways in which ideas may be expressed. In both cases, these artificial languages are expressly geared to preclude the kinds of debates over meaning and word change that characterize natural languages such as English.

Though Orwell's vision of society may be the most well-known example of the attempt to control thought through language, the Greek philosopher Plato, writing several

thousand years before, argued for the same measures. In Plato's case, however, he was not writing a novel about a future *totalitarian* society, but rather an extended analysis and description of the *ideal* society and government. Upon closer examination, though, Orwell's and Plato's visions are closer than one might think. In the *Republic*, Plato calls for the elimination of all words associated with fear, cowardice, and weakness, in order to ensure the courage and strength of his citizens:

Also we shall have to reject all the terrible and appalling names which describe the world below--Cocytus and Styx, ghosts under the earth, and sapless shades, and any similar words of which the very mention causes a shudder to pass through the inmost soul of him who hears them.

Further, he argues that stories in which men are portrayed as weak or base must either be banned altogether, or re-written to reflect noble and courageous behavior, concluding:

. . . the first thing will be to establish a censorship of the writers of fiction, and let the censors receive any tale of fiction which is good, and reject the bad; and we will desire mothers and nurses to tell their children the authorized ones only. Let them fashion the mind with such tales, even more fondly than they mould the body with their hands; but most of those which are now in use must be discarded.

"Let them fashion the mind with such tales"--as we will later see, Plato was not wrong in targeting stories as a means of changing and controlling society, however one feels about censorship. Indeed, he rightly observes that it is in stories, not individual words, that ideas can be most effectively transmitted and made more convincing.

Mentalese

If we reject lingualism, and conclude that thought can take place without language, we might wonder what thought is before (and if) it becomes embodied in language. One outcome of the investigations into the relationship between thought and language is the idea of a language of the mind that is distinct from any spoken human languages. This language is commonly called *mentalese* by those who study it. Depending on whom you speak to, mentalese may share several of the characteristics of spoken language, including having a syntax, a system for tracking meaning (semantics), etc. Whatever it consists of, most who argue that we think in mentalese claim that it is an innate language with which all healthy human beings are naturally endowed. If, for the present, we accept that thought takes place in mentalese, the question then shifts to an inquiry into the relationship between mentalese and language. Looking again at the tip-of-the-tongue phenomenon, it would seem that whatever idea a speaker is grasping at, but can't quite express, is clearly known to the mind; that is, it has already found "expression" in mentalese. If this is the case, then the difficulty has arisen in the translation between mentalese and, say, English.

Whether or not we accept the notion that thought takes place in a mental language distinct from any acquired language, by rejecting the extreme form of lingualism, we are left with a gap between thought and language. If the two do not operate in a one-to-one relationship, such that every thought takes place in corresponding words, then what kind of relationship *do* language and thought have?

Surveying the Gap

It is clear from the evidence amassed earlier that, at least in the individual mind, thought and language are not always perfectly connected. Does this mean that they are wholly disconnected? Of course not. Rather, we may safely say that language influences thought, and thought certainly influences language, but that neither has absolute authority over the other. Accepting this conclusion, however, has consequences. If our thoughts are not perfectly reflected in our words, then this implies some of our thoughts are imperfectly expressed either because our words don't say enough or they say something other than we intend. This problem has been a point of concern for philosophers and other thinkers throughout human history. The British philosopher John Locke, in his *Essay Concerning Human Understanding* (1690), begins a chapter titled "Of the Imperfection of Words" with the following:

1. Words are used for recording and communicating our thoughts. From what has been said in the foregoing chapters, it is easy to perceive what imperfection there is in language, and how the very nature of words makes it almost unavoidable for many of them to be doubtful and uncertain in their significations.

(Book III - Chapter IX)

Of course, one does not have to take up philosophy to fully understand this "imperfection of words." If you've ever had the experience of reading your own writing only to discover you have no idea what you meant, then you can number yourself among those who have confronted this problem. In this case, the words that you used at one point to represent a thought you had no longer conjure up that thought when you read them later on.

Because language and thought do not share a one-to-one relation, yet clearly influence each other, we might best describe them as *loosely coupled*. They are connected like two links in a chain, rather than fused like two pieces of metal welded together. Imagine, if you will, the way in which two chain links interconnect. If we pull on one link, the other will tend to be drawn in the same direction as the one it's connected to; however, even though it will match the first link's angle and position fairly closely, this other link may not arrive at *precisely* the same angle. In other words, the second link will approximate the position of the first within certain limits. Such is a useful way of thinking about the relationship between thought and language: they strongly influence each other, but with some room for play.

Having come to understand that language and thought are not fused together, but only loosely coupled, we are in a position to usefully describe speaking as a kind of act of *translation* between thought (perhaps mentalese) and a language. This also identifies one of the principal difficulties faced in spoken or written communication: because there are so many different ways of translating the same thought into words, speaking or writing becomes an attempt to transfer our thoughts into the best possible language for communicating them. To further complicate the problem, the "best possible language" doesn't always mean the same thing: it is determined by what is most effective in a given situation. In other words, it all depends on what you're trying to accomplish. If your goal is to convince someone that a particular course of action is not wise, the phrase "a boneheaded move" may be the best possible language for doing so if you are addressing a peer. However, if your audience consists of an elderly citizens' group, the very same

phrase would probably rank somewhere among the worst possible language for achieving your goal. Continuing Locke's earlier observations on the imperfections of language,

To examine the perfection or imperfection of words, it is necessary first to consider their use and end: for as they are more or less fitted to attain that, so they are more or less perfect.

we may observe that Locke agrees with us perfectly. That is, of course, if what we think he means is what he actually meant. If he didn't, then presumably his words on imperfect language were, ahem, imperfectly suited to making his point to a 21st-century audience he could hardly have imagined.

By introducing the concept of goal or purpose as the instrument with which to judge the quality of our words, we shift emphasis from language as a tool for recording our thoughts and begin to address language as a tool for communicating our thoughts to others. It is in this arena, some would argue, where the relationship between thought and language really becomes interesting.

The Real Impact of Language Upon Thought

Pick up any tabloid, and you stand a fair chance of coming across an article that brings up mind control. While most of these playful simulations of journalism blame the government, aliens, or some combination of the two for the insidious attempt to manipulate human beings as mere puppets, they overlook a perfectly common and commonly used form of mind control: language. While not as glamorous as implanted devices or UFOs, language is also much more a part of our everyday reality than tabloid mind control phenomena. If we think even for a moment about the function of language, we realize immediately that we use it largely, if not solely, to communicate with other members of our species. And in communicating, we are attempting to influence the thoughts of others. We want them to give us something; we hope to convince them to behave in a certain way; we ask them to see things from our perspective. Or, more generously, we tell them the rope is too short; the ice won't bear their weight; the investment is not a wise one. In each of these acts we are utilizing language to impact another person's way of thinking, with the hope that our communication will be properly understood and acted upon.

Thus, at even the most general level, language is clearly a tool for attempting to control the behavior of others. Of course, one might object that it is an imperfect form of mind control, because no outcome is guaranteed. I can tell you to give me all your money, and you can very well tell me you won't. The important thing to keep in mind here is that, however you respond, the fact that you understood and acknowledged my communication is already proof of the impact my language has had on your thoughts: I made you consider giving me all your money, even if you immediately rejected the notion. Similarly, you can read this textbook, which attempts to get you to think about language and writing, and reject everything it contains. Yet by the time you make the conscious decision to deny everything, you've already spent a fair amount of mental effort figuring out what it's claiming. In general, it is impossible for people not to respond in some way to a communication in a language they understand. The mind processes any speech or text it recognizes upon perceiving it, whether we like it or not. Thus we have

all had the experience (though probably not in recent memory) of stopping up our ears and chanting or humming in order to avoid listening to someone. Such extreme measures are necessary because we cannot simply will our minds not to process the incoming speech sounds.

It was suggested above that it is in the realm of interpersonal communication that the thought-language relation really becomes interesting. It is, one might say, where the action is. Indeed, it is where all of our most important actions take place: it is through written or verbal exchanges that we establish relationships, arrange for financing, find or become leaders, and generally make our way about the world. And when our words, which are the careful product of our specific thoughts, cause others to think the wrong thing, we have one of the staples of the sitcom. The "misunderstanding" is one of the classic devices used to generate plots in this genre. Thus, for example, we have the romantic misunderstanding:

"I thought you liked me."

"Well yes, I said I liked you, but I didn't mean I *liked* you liked you. I just meant that I liked you."

"Oh. So you don't really *like* me?"

"No. I like you, but I don't *like* you."

"Whew! I'm relieved, because I don't *like* you either."

And the audience is left beside itself with mirth at this kind of mistake, where one character's utterance is taken to mean too much or too little, or something entirely different from what the speaker was thinking. Naturally, what makes this funny to the audience is the fact that, unlike in real life, they're in on the joke: they know what the speaker was thinking, as well as what the hearer (wrongly) took the speaker to mean. In this case, the misunderstanding is completely harmless, and perhaps amusing. Sitcom material aside, the problem of getting our audience to understand what we mean by what we say can be a serious one. And often enough, we can't be sure that our audience is even close to arriving at the thought we want them to have. This is where we can grow frustrated with language, with the difficulties it imposes upon the transmission of our thoughts.

On the other hand, we shouldn't be led into the illusion that our thoughts exist wholly independently of language; it is not as though we each naturally possess a mind full of perfectly clear and coherent thoughts that are impaired only by our need to communicate them. As much as we can see language as a problem of sorts, given its impact upon our ability to share thoughts, language is also the means by which we got the majority of things we think about into our heads. Further, we often don't know precisely what we think until we say it or write it down. Only by making our thoughts concrete, by putting them into words, can we begin to consciously and coherently explain ourselves to ourselves (and others). This is, in a sense, the flipside of the problem described above: while one source of trouble is, as noted, the difficulty of putting our thoughts into the words we believe will make others react the way we want, another set of problems arises out of the difficulty we have in trying to figure out what we actually think by trying to fit

those thoughts to corresponding words. For example, if asked how one feels about tripe, one might have to sort through possible responses, as in:

Appalled. No, that's too strong. Disgusted? Perhaps. Yet I'd say I'm intrigued, in a sense. . . the honeycomb-like structure is quite striking.

In this case, the speaker is sorting through specific adjectives to find one that best explains his state of mind, yet at the same time his state of mind is in some sense unclear even to him until he finds a word or words to describe it to himself. This problem is only exacerbated when we try to write, as writing usually demands lengthier and more carefully thought-out responses. What do you think about the first amendment? You probably really don't know until you try to explain it on paper (assuming, of course, you are familiar with the first amendment is in the first place). So, in sum, we find that language has an impact on thought in two essential ways: we use language to affect others' thoughts, and we use language as a tool for understanding our own.

Writing: The Ill-Defined Problem

If our attempts to get a listener to understand what we mean by what we are saying can (and do) fail, the attempt to communicate through writing is fraught with even greater difficulties. For when we speak to someone, we can, for example, use questions to find out whether we are being understood. Further, we can use a wide range of *extralinguistic* cues to help make our meaning clear. That is, we can make use of gestures, facial expressions, props, and eye contact in order to illustrate what we are saying, to communicate emotion or the lack of it, to emphasize a point or a word. Writing, however, strips us of all of these tools that we naturally (and usually unconsciously) utilize to make our words have the effect we desire. For many inexperienced writers, it is this loss of the immediate interpersonal context that gives them the greatest difficulty when they try to put thoughts to paper. Without access to questions, gestures, and expressions, they can feel as though they are being asked to speak without moving their lips. Yes, some communication can still take place, but it feels unnatural, strained, and lacking fluency.

Because writing lacks the support provided by interpersonal cues, the task becomes an attempt to put thoughts into words that can, in some sense, "stand alone." Further, it is a lonely task, one that is at least one step removed from typical social exchange. Put another way, we can describe writing as a kind of problem-solving activity. If we begin to characterize a given writing task as a kind of problem, one in which the solution to the problem is the set of words that most effectively communicate our thoughts, then we can say a few more things that might help us understand why writing can be so difficult. Writing, taken this way, belongs to a class of problems known as *ill-defined* problems. These kinds of problems are characterized by the lack of a best way to represent the problem, unclear means of solving the problem, and the possibility of multiple valid solutions. Perhaps these qualities can be made clearer if we look at one class of *well-defined* problems: basic arithmetic. Specifically, we will concern ourselves with addition.

If we pretend for a moment that you do not know how to add, then the following material should be incomprehensible to you:

$$3 + 5 = ?$$

To your addition-blind mind, these numbers and signs mean nothing to you. Perhaps you recognize the three and the five, you may even think of them as quantities (i.e. five squid), but their arrangement in conjunction with those odd-looking symbols means nothing to you. You can't *do* anything with this information.

Now, let's imagine you've learned how to add. You look at the same problem again, and you think:

$$\begin{array}{r} 3 \\ \underline{5 +} \\ 8 \end{array}$$

Notice how you've changed the way you represent the problem. You've taken the original information and put it into a form that makes solving the problem easier. You also know what to do with the numbers given the sign associated with them. And we compliment you upon your talents. Now, to challenge you, we throw you another problem:

$$467 + 923,000,001 = ?$$

And so you do this:

$$\begin{array}{r} 923,000,001 \\ \underline{467 +} \\ 923,000,468 \end{array}$$

Clearly, you've demonstrated mastery over addition, especially given your strategic placement of the larger number over the smaller. Once you've learned the rules for addition, and the best way of arranging the information taken from the problem, you can solve any number of addition problems. Further, you know that there will always be just one correct answer, one that you can verify by doing the same problem twice. Once you've got the method, you know how to get to the answer, as well as what it should look like (you know you've done something wrong if, say, the answer to the problem above ends up only two digits long, no matter what two digits they are).

Addition, then, is a well-defined problem because it is easy to specify the best way to represent the information taken from the problem, the method of solving the problem is clear and specific, and there is only one valid solution. Returning to the problem of writing, we find that none of this holds true. Take, for example, the following writing problem:

Write an essay that identifies and critiques Alice's assumptions about reality in Lewis Carroll's novel, *Alice in Wonderland*.

How do we best represent the information in this problem? In the first place, one might object that there is very little information given up front. In the second, the activities the prompt requires, identification and critique, are themselves fairly ambiguous. What constitutes identification? Simply naming an assumption? describing it? labeling it according to some system? And critique is perhaps less clear. Does it imply criticize, analyze, put into some kind of structure or system? All or none of these things? Even if you are familiar with writing this kind of essay, these terms remain open to fairly wide interpretation.

If we cannot even begin with a best way of representing the information contained in that problem, we are certainly no better off regarding any method of solving the problem. How do we go about determining what counts as an assumption, what assumptions are important, what kinds of critique are relevant? Where do we begin? Put

more plainly, where is the step-by-step kind of approach that worked so well for us when we were adding?

Finally, even if we manage to represent the information given in the problem in some way that makes sense to us, and we find some method that seems suitable to solving the problem, we really have no way of knowing that we've arrived at the right solution. Indeed, if we think about it, there really is no "right" solution, but a number of potentially equally valid solutions. All other things being equal, you and I could each write an essay that would be judged by the same reader as "good," and yet there is little likelihood that our essays will look anything alike. You begin with a quotation from the text; I start out with a historical reference. Which one is "right"? You have five shorter paragraphs; I have four slightly longer ones. Again, is one of these structures "right", and the other "wrong"? Experienced writers contend with this problem all the time: they can produce ten or twenty different versions of a text, and find each of them good in a different way. Novice writers sometimes have the opposite problem: they end up with one version of a text, desperately hoping it's the right one. And if they receive positive feedback, some mistakenly believe they've hit upon the "right" way to write, rather than just one of many possibilities.

Solving an Ill-Defined Problem?

If writing, as an ill-defined problem, presents so many, ahem, problems, how can anyone hope to solve it? Well, the short answer is that it depends. One way of reducing the difficulty of a writing problem is to introduce *constraints*, that is, limits upon what a possible solution can look like. One popular constraint is the five-paragraph essay. This form dictates within very specific limits the length and form of the solution. Other constraints might be a limit on the number of issues you address; the requirement that for every piece of positive evidence you provide, you must provide one negative piece; specific rules for the order in which you present your material. Each of these constraints, or limits, blocks out a whole realm of possible solutions that are deemed unacceptable. This explains, in part, the popularity of the five-paragraph essay. A beast never seen in nature, it very effectively eliminates from consideration one, two, three, four, six, seven, *ad infinitum* paragraph essays. Further, it typically tells you that your introduction and conclusion should be almost identical, and that the three paragraphs in the middle should follow an order set out in the first. In short, this is the closest you get to a clear method or formula for solving a writing problem. Unfortunately, and here's the kicker, it makes no guarantee (and some would say it guarantees against) that the resulting solution will actually be worth reading. In fact, it doesn't care a whit about whether or not five paragraphs is enough or too many to solve a particular writing problem. In essence, it declares what will be found to be good before any solutions are offered and examined. More to the point, if it is promoted by a particular instructor, it lets you know what will be found to be good by *that* individual instructor.

There are, of course, more "natural" constraints. If I am writing in a particular genre, for example, such as a technical manual, it is clear that any acceptable solution will have to avoid extended riffs on the importance of having a pet. It is important to keep in mind, however, that a technical manual filled with such commentary is not *necessarily* a piece of bad writing. Rather, it is just a bad technical manual. In other words, and we will cover this in more detail in a later chapter, **the "goodness" or "badness" of a**

particular piece of language is absolutely dependent upon the purpose to which it is put. This includes any writing you do for a class. Just because your essay didn't fit the instructor's ideal vision of a historical report doesn't mean that the writing itself was inherently bad. Rather, it was that your writing did not convey the best possible thoughts in the best possible words as determined by that instructor. Of course, there is some practical incentive for discovering what particular values and constraints your audience (be it your instructor or your attorney) has in mind when judging your writing. After all, even if it were not a grade at stake, if your goal in writing is to communicate effectively, then you'd better be as certain as you can that what you write is going to have the effect you desire. We are not in the realm of "Right" or "Wrong," or "Good" or "Bad," in the larger sense of these terms, but in the realm of what ends are achieved by a given solution to a writing problem. Your solution is a good one if it accomplishes what you want it to; it is a bad solution (but again, perhaps not bad writing) if it does not.

In addition to constraints, natural or otherwise, becoming better at solving writing problems involves what amounts to a simple rule that requires a great deal of practice: know what kinds of solutions other people have employed. The bumper sticker version of this is: READ MORE. One of the best ways of discovering both what works as a solution to a writing problem and what doesn't is to see how others have attempted to solve given writing problems. This isn't as difficult as it sounds; depending on what you are trying to write, the material may be easy to read and readily available. If your goal is to produce a movie review, it would be prudent of you to consult other movie reviews in order to know how other have solved this particular writing task. In any case, the only way to really know both what interested people might expect from a solution and have seen and accepted in a solution is to look at actual solutions to a writing problem. As you might expect, depending both upon your audience and the kind of writing you need to do, what qualifies as a "good" solution depends a great deal upon the situation in which you find yourself required to write.

So we leave this introductory chapter with a number of problems identified, and few solutions achieved. Writing is difficult for a number of reasons, including:

- our thoughts don't always easily translate into words
- the same thought can translate into a number of different forms
- we don't always know if we are understood as we mean to be
- we can't supplement our words with gestures and expressions
- there is no guaranteed form, method, or solution to a writing problem

In the chapters to come we will examine in more detail some of the specific problems writing poses, as well as look in more detail at the relationships between certain kinds of writing and certain ways of structuring writing and the way we think.

Chapter 2: On the Origin and Nature of Language

We begin this chapter with an unnatural question: where did language come from? This is an unnatural question because it is precisely the sort of thing we don't need to concern ourselves with in order to be perfect language users. Nevertheless, a general familiarity with the history of language provides important insight into the way we use language today.

There are between 4,000 and 6,500 naturally occurring human languages in the world, depending on whom you consult. Most people speak only one fluently; others speak perhaps two or three languages. Where did all these different languages come from? Were they "made up" by the ancestors of the people that speak them? Or do they all come from one "original" language? Many people are familiar with the explanation found in the Bible, the Book of Genesis:

And the whole earth was of one language, and of one speech. And it came to pass, as they journeyed from the east, that they found a plain in the land of Shinar; and they dwelt there. And they said one to another, Go to, let us make brick, and burn them thoroughly. And they had brick for stone, and slime they had for mortar. And they said, Go to, let us build us a city and a tower, whose top may reach unto heaven; and let us make a name, lest we be scattered abroad upon the face of the whole earth. And the Lord came down to see the city and the tower, which the children of men builded. And the Lord said, Behold, the people is one, and they have all one language; and this they begin to do: and now nothing will be restrained from them, which they have imagined to do. Go to, let us go down, and there confound their language, that they may not understand one another's speech. So they Lord scattered them abroad from thence upon the face of all the earth: and they left off to build the city. Therefore is the name of it called Babel; because the Lord did there confound the language of all the earth: and from thence did the Lord scatter them abroad upon the face of all the earth. (Genesis 11:1-9)

The story of the Tower of Babel provides one solution to the problem of *language diversity*, that is, the fact that we can identify thousands of languages that, at first glance, seem very different. As a story, it also demonstrates the power of language to unite people upon a common cause, the ability of users of a shared language to form complex plans and execute them. Taking this story as his cue, the popular science fiction author Douglas Adams invented the "Babel fish," a fish you drop into your ear that permits you to understand any language in the universe (the fish does the translating for you). Of course, Adams goes on to note that with all barriers to communication removed, the result is more and bloodier war than ever seen before. Perhaps some things are better left unsaid, or, in this case, untranslated.

Setting aside Babel-fishes and towers, we might look for other explanations for language diversity as well as the origin of language, an problem not covered in the biblical story. One problem with searching for the origin of language is that, to put it plainly, language does not fossilize. That is, prior to writing, which is only some 6,000 years old, we have no records of what human beings were speaking during the other

94,000 or so years of our species. It is as if we have one piece of a very large puzzle, and we are trying to use it to guess what the whole picture looks like. Still, researchers have been able to come up with some relatively clear theories about the origin and development of language. They have done so using three different approaches:

- 1) Studying the way in which individual human beings acquire and develop language skills
- 2) Examining different languages for similarities and the ways in which larger human communities use languages
- 3) Analyzing the behavior and means of communication of nonhuman species for evolutionary and cultural precursors

We will spend the bulk of this chapter examining each of these approaches in turn to see what they have revealed about the nature and origin of language.

"An Instinctive Tendency to Acquire an Art"

Darwin coined the above phrase in order to describe, in a nutshell, the complex relationship between human beings and their languages. To make sense of it, we need to unpack that phrase and see what ideas it represents. For one thing, we normally think of instinct as something associated with non-human species; we might talk of a female bear's instinctive defense of her cubs. Art, on the other hand, is a term typically reserved only for human activities. In this case, we may take the term "art" to refer broadly to any practiced, skilled activity, whether we are talking about weaving, carpentry, or software development for that matter. Instincts, then, are inherited; the bear does not "learn" the impulse to save her cubs, she simply does it as all female bears do. Art, on the other hand, is learned; no-one is born an electrician or a programmer. These skills must be developed through education and practice. By calling language "an instinctive tendency to acquire an art," Darwin appears to describe language as some combination of inherited characteristics and learned skills. Perhaps, then, we can begin by framing the problem of language origin and acquisition with a familiar dichotomy: nature vs. nurture. Or, put another way, we can investigate whether language is a product of genes, and therefore an evolutionary development, or culture.

We might begin by investigating the first claim: that language is the result of an evolutionary adaptation which is encoded in human genes. However, even a brief comparison between language and other acquired traits known to be controlled by genes suggest that genes can't be the whole story. For one thing, language doesn't function the way other acquired traits do. Take eye color, for example. We inherit genes that determine eye color from our parents. If a child has brown eyes, we know that one or both of her parents had brown eyes as well, due to the way genes for eye color function. We might compare the inheritance of eye color with the inheritance of language. Let us imagine a child of two Russian-speaking parents. Presumably, both would carry the genes that encode Russian. However, if you take that child from birth and raise her in a French-speaking household, she will surely grow up speaking French, not Russian! That is, even with genes made up from parents who spoke only Russian, she would show no signs of Russian in her speech, only the French that she grows up with. This would certainly seem to strike a serious blow against any contention that language is solely the product of genes.

We have a further piece of evidence to support the argument that genes alone are not responsible for language development, evidence that comes, unfortunately, at great price. You may have heard so-called "wild child" stories, which are tales of human children who grow up in the wild without any human contact. Tarzan, you may recall, is the name of a character and a novel with similarities to real-life incidents of this sort. Unfortunately, we have a case of a real child, discovered in 1970, who, living in the United States in an urban area, lived for thirteen years trapped in a house by her abusive father. During this time, she was almost never spoken to, and was harshly punished for any sounds she made. She had no contact with the outside world, and, we are told, rarely heard the voice of any other human being except her father. This girl is known to the scientific community as Genie.

The line famously associated with the character Tarzan is, "Me Tarzan. You Jane," a line calculated to reveal both Tarzan's lack of exposure to English as well as the limits of his ability to speak it. Genie was almost equally unfamiliar with English (or any language for that matter) when she first appeared in a Los Angeles social services office. She is described as having had less than a twenty-word vocabulary, and only willingly expressing the words "Stopit" and "Nomore." Unfortunately, though her language skills grew significantly in the years following her "discovery," she never developed the full set of language skills that every normally-developing human being takes for granted. For example, she never acquired the ability to properly form questions, producing instead oddities like, "Where is may I have a penny?" She had trouble with pronouns, using "you" and "me" interchangeably. Syntax and word endings never fully came to her. Even seven years after being immersed in human conversation, she still produced sentences like "Think about Mama love Genie."

What makes Genie's linguistic development, or lack of it, both odd and relevant to our purposes is the fact that, by all other accounts, she possessed normal intelligence and cognitive abilities. She has been compared to a stroke victim who, though he knows what he wants to say, cannot form or express the words. Now, admitting this is a complex case, and a rare one at that, what Genie's lack of language ability suggests is that genes alone do not determine a person's ability to learn and use a language. That is, if she were genetically endowed with language, then she should have spoken some kind of language (even if not English) when she walked into that Los Angeles office. At the very least, she should have been able to learn and utilize one just like anyone else. However, the case of Genie suggests something else as well: if language acquisition depends upon being socialized, upon being exposed to other human beings speaking a common language, then shouldn't Genie have ultimately developed her language skills to a normal level? If we think of other culturally-acquired skills, such as cooking or mathematics, or even bicycle riding, don't most normal people develop their abilities in these areas given enough time and practice?

Rather, what Genie's story, along with the stories of other real-life "wild" children, implies, is that there is a critical period during human life when, if we are to become effective language users, we must be exposed to language use by others. In other words, if either genes or culture alone produced language ability, we would expect that, eventually, Genie would acquire the same or similar proficiency as anyone else. However, this has not happened. Timing, then, may be the issue. It appears that Genie

needed something more than just the right genes or just any exposure to language speakers. She needed both, and at the right point in life.

To figure out what a "critical period" for language learning might be, and to attempt to assess what goes on during that period that makes such a difference, we might examine how a healthy child in a normal social environment acquires language. Indeed, it might be useful to think on your own experience. If you are an English speaker, you remember, surely, the long hours a parent drilled you on past participles, making you memorize the "-ed" affix rule, and the trouble he or she took to get you to properly form infinitives (of course, you probably still split them to this day). No? Perhaps, then, you recall the frequency with which you were reminded that English is principally a Subject-Verb-Object language, especially when you were so fond of saying things like "Cookies steal I" and "Watch you television" (Object-Verb-Subject and Verb-Subject-Object arrangements, respectively). Still no recollection? Well, every English speaker must remember the rule for the order of adjectives: number, age, nationality, and gender. Mom or Dad didn't teach you that one? Obviously, you must say things like:

Over there are men Italian five old

Adolescent two girls American took my lunch money

Whereas an educated speaker of English would say:

Over there are five old Italian men

Two adolescent American girls took my lunch money

Right?

Let us pause here and knock down the little house of cards we've constructed. While some people might have been willing to believe that parents (*all* parents, importantly, since most language learning takes place at an age when parents are the primary source of spoken language for children) teach their English-speaking children that the past tense of regular verbs is formed by adding an "-ed" to the end, you would be hard-pressed to find someone willing to claim that a parent (or anyone else, for that matter) told them *the rule for ordering adjectives is as follows: number, age, nationality, and gender*. Yet this is a rule that every native speaker of English naturally and unconsciously knows and obeys. And you thought you were no good at grammar.

What the above evidence suggests is that parents are *not* responsible for "teaching" their children language. That is, language isn't learned in the way that, say, math is learned, where an adult carefully instructs and catechizes the child-learner in a formal, step-by-step way, with attention to explicit rules, such as those for multiplication and division. Or put more accurately: while parents may be responsible for teaching their children vocabulary, the *rules* for using language, for forming past tenses, organizing subjects, verbs, and objects, and arranging adjectives are acquired unconsciously, apparently by a system in the brain that is perfectly suited to plucking out and using the grammatical rules underlying a language it is exposed to. Further, children put these rules to work on words they've never heard before. Ask a seven-year-old to tell you what happens when one "wug" meets another "wug," and she'll likely tell you you've got "two *wugs*." That is, she will form the plural of a word she's never heard before according to a rule that she doesn't know she knows.

And this isn't simply due to being exposed to rules; for example, while arguably every American student has been exposed, both in print and in class, to the rule for using an apostrophe with "its," many students still don't punctuate according to the printed norm. Clearly, apostrophe use is not in the genes. So even if we were to argue that some kind of imitation of adult speech is involved in children's language acquisition, it still seems to be a very different kind of imitation, one that functions without conscious effort. In short: you will have to memorize the rule for punctuating "its," but you'll never have to memorize the rule for arranging adjectives in English. Though we will explore it in greater detail in the next chapter, many of the difficulties of writing (including punctuating appropriately) are traceable to this fundamental difference between the natural, unconscious acquisition of spoken language rules and the formal memorization of rules for written language.

Children, then, are notoriously good at picking up the rules of the language(s) they are exposed to. On the other hand, adults are not. If you are a native speaker of English, you may not have had to consciously memorize the rules for forming the past tense, but if you want to learn how to form the past tense in French, you'll probably spend a great deal of conscious effort trying to memorize those rules. Simply sitting in a French cafe and listening to passing conversation won't get you very far. So where does this leave our notion of a critical period for language acquisition? Well, current research suggests that we are at the height of our language-acquiring powers during our earliest years, with our abilities generally declining as we approach adolescence. After that, for most people, it is increasingly difficult to learn unfamiliar languages. Why this is so isn't fully clear at this point; it probably has a great deal to do with the brain's *plasticity*, or flexibility, during preadolescence. As for Genie, we may observe that she appeared in that LA social services office at the age of thirteen, traditionally the onset of adolescence.

On Language Acquisition Devices and Connectionist Networks

If we are right, and there is some feature of the brain that picks up rules of the kind described above, we might ask exactly what part of the brain is doing this. Indeed, one of the most important debates taking place among those studying language and the brain concerns whether or not the brain has a structure specifically geared to acquiring language. Noam Chomsky has famously suggested that the brain has a *language acquisition device* which enables it to learn human languages. This is a module, a distinct part of the brain, specifically equipped to learn language and nothing else. Humans speak languages because they have this device; other animals lack it, and so they can never learn any human language. This view has been dominant for some time, and has received some support from evidence that the functioning of some regions of the brain bears a direct relationship with a person's ability to use language.

More recently, however, there has been increasing evidence that suggests our ability to learn language is merely a feature of a more general capacity for learning. Researchers have been developing computer-based models that attempt to simulate the ways in which the neurons in the brain process and store information. These *connectionist networks* have been shown to learn key aspects of languages they are exposed to, even though they have no specific programming that tells them what to look for; indeed, the networks don't even know that the input they receive is *language*. One

early effort succeeded in developing a network that learned how to form the past tense in English, again without being explicitly "taught" the rules for verb tense formation in English. Evidence like this suggests that language acquisition may not be genetically hard-wired into the brain, but may result from more general human cognitive abilities.

Regardless of whether the existence of a specialized brain module for learning language is discovered, or we find that general-purpose learning mechanisms can account for the same thing, it is clear from both kinds of research that there is something special about the human brain that makes it possible for us to speak as we do.

Nature versus Nurture, Revisited

We can close our discussion with one more look at what features of language appear to be innate to human beings. On the one hand, the fact that every normal human being can easily acquire language at a very young age strongly suggests that this ability is innate, that it is a genetically-based part of our standard equipment. The fact that human languages vary significantly, however, and that our exposure to them at an early age determines which ones we learn, is strong evidence for the idea that language is developed as a result of human culture. As with all arguments framed by the extreme characterization of nature *versus* nurture, of genes versus environment, we find that the truth lies in a combination of the two. So it is with language: we have good evidence for the fact that we have a genetically-provided base for learning language, but we can't learn a language without being exposed to other people. So Darwin had it right: the development of language skills is best characterized as the result of "an instinctive tendency to acquire an art." Genes meet culture, and language is produced.

Although we don't yet have an answer as to what the exact origins of language are (and some experts, including the famed linguist Noam Chomsky, think it is futile to search for them), given the evidence for both genetic and cultural roles in language acquisition, we can tentatively conclude that language similarly originated out of interactions between the two. That is, we can be fairly certain that language did not suddenly appear full-blown as the result of a genetic mutation, nor did it simply develop out of early human social interaction. Genes and environment worked in tandem to produce the means by which a person can assert, "I really wanted that ham sandwich until you parked on it."

However, even if this gives us some idea as to how an individual acquires language, it doesn't explain much about the nature of language itself. We find further enlightenment when we look at multiple languages at the same time in order to determine what, if anything, their similarities and differences might tell us about the equipment in our heads. So we move on to the second major resource available to language researchers: the diversity of languages in the world.

Just How *Different* Are Different Languages?

Depending on the number and kinds of languages you have been exposed to, an unfamiliar language may sound like nothing more than a stream of incomprehensible sounds, a babble from Babel, if you will. Or, you may find that you can pick out some sound combinations as reminiscent of words in a language you know. Those of you who

have taken a foreign language, or are perhaps lucky enough to be bilingual, have probably noted coincidences, odd relations between the two (or more) languages you have experience with. Perhaps English and Spanish seem more similar than, say, English and Chinese. The comedian (and, apparently, amateur linguist) Steve Martin has done a bit on the differences between learning French and Spanish for native speakers of English. He suggests that with Spanish, all you have to do is pronounce every consonant of every word, and shift your vowels slightly. This is, of course, an exaggeration; yet the joke wouldn't work if it didn't *almost* seem plausible. Why do some languages seem more similar than others? Further, how did all these different languages come about?

At the beginning of this chapter, we looked at one attempt to describe the history and evolution of language: the story of the Tower of Babel. This story provides a *monogenetic* theory of language, that is, a theory of language that proposes all existing languages derive from one original language. This search for "the" original language has been around for a very long time. The ancient Greek historian Herodotus tells of an Egyptian pharaoh who, in his efforts to determine whether the Phrygians or the Egyptians were the oldest people on earth, had two infants put into a hut, far away from all regular human contact. He arranged for a shepherd who cared for them, and who was instructed never to speak within the children's hearing. The pharaoh's idea was that, left alone together without any exposure to any other language, the children would naturally begin speaking the very first language, which would be the language of the oldest people on earth. Unfortunately, we don't have much data from his morally dubious experiment, one which would never pass a review board today. We are told that, after two years, the children began speaking one word regularly. The word sounded like *bekos*, which was the word for bread in Phrygian. The pharaoh then concluded that Phrygians were more ancient than the Egyptians.

We have come upon better ways for investigating the relationships between languages (and peoples) in the last several hundred years, and a number of pioneers made a few key observations that paved the way for the understanding of language diversity that we have today. Among these discoveries were those made in 1786 by Sir William Jones, a British judge stationed in India, who noted that certain features of Sanskrit, a very ancient language, bore remarkable similarities to features of Greek and Latin. Here are the kinds of similarities he noted:

<u>English</u>	<u>Greek</u>	<u>Latin</u>	<u>Sanskrit</u>
father	pater	pater	pita
brother	phrater	frater	bhratar
is	esti	est	asti
ten	deka	decem	dasa

It should be fairly evident, at a glance, that the Greek, Latin, and Sanskrit words for *father*, *brother*, *is*, and *ten* are very similar in both structure and sound. The word for father in all three languages, for example, has the common structure *p-t*, with a vowel appearing in place of the hyphen. Similarly, all three words for brother share an *r-t-r* structure. The consistency of these patterns improves if we note that some of the differences among the three seem to follow a rule. For example, it appears that the vowel *e* in Greek and Latin corresponds to an *a* in Sanskrit; thus Greek *esti* corresponds to Sanskrit *asti*, and Latin *decem*, if we did not know it in advance, would lead us to suspect something like *dasa* as the corresponding word in Sanskrit. The more correspondences

like these we find, the more we are inclined to believe that they are not merely coincidental. For example, consider the word for *ten* in these languages:

<u>Hungarian</u>	<u>Arabic</u>	<u>Turkish</u>	<u>Japanese</u>
tíz	ashara	on	juu

At least as concerns the word *ten*, it appears that Hungarian, Arabic, Turkish, and Japanese are both a) unrelated to Greek, Latin, and Sanskrit, and b) unrelated to each other. Now, of course, we have to wonder: what does it mean for Greek, Latin, and Sanskrit to demonstrate the kinds of similarities they do? What kind of "relation" are we talking about? Based upon the kinds of correspondences between Greek, Latin, and Sanskrit identified above, Jones arrived at an extraordinary hypothesis: that all three languages "sprung" from some prior language. To understand what it means for one language to come from another, however, we need to understand a few things about how languages change. We also need to characterize more specifically the type of linguistic similarity that Jones used to form his hypothesis.

Cognates & Language Change

When, as above, we find a word in one language that closely corresponds in meaning and sound to a word in another language, and conclude that it is because both languages derive from the same parent language, we call those words *cognates*. Thus Greek *esti* and Latin *est* are cognates, as they both mean *is* and follow a very similar pattern of sounds. However, the Greek *deka* and the Arabic *ashara* are not cognates, because even though both words mean *ten*, they appear to have nothing in common in terms of the sounds that compose them. Now, suppose you come across the Polish word *komputer*. You are familiar with the English word *computer*, you discover that both words refer to the same kind of object, and, obviously, they share very similar sound structures. Have you discovered a cognate? No, unfortunately. In this case, the Polish *komputer* is a *borrowed word*, not a cognate. An English word was simply adapted for use in Polish by a slight change in pronunciation.

This distinction between cognates and borrowed words is an essential one, because only cognates can be used to determine whether two languages are related. But perhaps this begs an important question: how do we end up with cognates in the first place? And how, specifically, do they differ from borrowed words? To answer these and other questions, we need to look at how languages change. Perhaps the best place to begin is with the language most readers of this text will have learned first, English.

Consider, for a moment, the various tenses of the verb *to be* as compared to the same tenses of the verb *to walk*:

<u>Verb (infinitive)</u>	<u>to walk</u>	<u>to be</u>
Present tense:	I walk	I am
	You walk	You are
	They walk	They are
Past tense:	I walked	I was
	You walked	You were
	They walked	They were

Future tense:	I will walk	I will be
	You will walk	You will be
	They will walk	They will be

The regularity of the verb *to walk* is almost elegant next to the unruly *to be*, with its shift from *was* to *were* as soon as you leave first person behind, and the radical differences in sound and appearance between *am*, *were*, and *be*. After all, even most non-speakers of English could fairly guess that *walk* and *walked* are related. But *be* and *were*? They look like two completely different verbs. Which makes sense, because they used to be.

Go back a thousand years or so to Anglo-Saxon England, and any speaker of Old English will tell you that your English verb "be" is an odd blend of his verbs *bean* and *waesan*. At some point in time, these two distinct verbs merged into the one verb we know as *to be* today. Just looking at the original forms of the two Old English verbs, you can see where the *be* and the *was* of our modern verb come from. If you're lucky, your Anglo-Saxon acquaintance might turn out to be a *scop* (the word for an Anglo-Saxon poet, and pronounced something like Modern English "shop"), and perform a poem that begins something like this:

1	Oft him anhaga	are gebideth
2	metudes miltse,	theah the he modcearig
3	geond lagulade	longe sceolde
4	hreran mid hondum	hrimcealde sae,
5	wadan wraeclastas	wyrd bith ful ared.

Translated,

1	Oft to the wanderer	weary of exile
2	Cometh God's pity,	compassionate love
3	Though woefully toiling	on wintry seas
4	With churning oar	in the icy wave,
5	Homeless and helpless	he fled from fate.

While you're there, talking Old English with the Anglo-Saxons, you might want to warn them of the impending arrival of William the Conqueror, due to arrive from France in 1066. Of course, if you are comfortable with Modern English, you might want to reconsider offering any advice, because it is with the arrival of the Norman French in 1066 that Old English undergoes the radical transformations that turn it into what we call Middle English, the language of Chaucer. Although not easy reading for readers of Modern English, it is certainly more accessible than the language of the Anglo-Saxon poet cited above. Here is a sample of Middle English, a speech made by a shepherd in a play known as *The Second Shepherd's Pageant*:

1	Sich servandys as I, that swettys and swinkys,
2	Etys oure brede full dry, and that me forthinkys.
3	We are oft weytt and wery when master-men winkys;
4	Yit commys full lately both diners and drinkys.
5	Bot nately
6	Both oure dame and oure sire,
7	When we have ryn in the mire,
8	Thay can nip at oure hire

in pronunciation are not well understood, in part because they take place very gradually, over a period of generations. For example, the most significant change in the pronunciation of words in the English language took place in the period 1400-1600, roughly the transition from Middle English (think Chaucer) to Early Modern English (think Shakespeare). Known as the Great Vowel Shift, it is the systematic shift in pronunciation of a half a dozen sounds. To give you an idea as to how important this shift is to our modern speech, consider that before the shift, the word *eye* would have rhymed with the modern pronunciation of *tree*. Unfortunately, the reasons for this dramatic change remain a mystery.

Now, given that we know both vocabulary and pronunciation are always subject to change, how does this explain the creation of one or more new languages from one parent language? Well, keeping in mind the above examples, assume that a group of speakers of one language splits off and begins living in a geographically remote area, disconnected from their homeland. Now, assume that language goes on changing for both groups in the ways described above; each group begins acquiring new vocabulary, and small changes occur in the way they articulate sounds. But note that neither group will experience precisely the same changes. Without regular contact, each will experience the addition of new words, the loss of others, and general changes in sound and meaning without sharing those changes with each other. Now imagine five hundred or a thousand years pass. What will we find? Well, the two languages will probably look as different from each other as modern English and German do. And, as you may already know, the mini-history just described parallels the actual development of English out of a Germanic dialect that also led to the German spoken today. That is, some Germanic tribes left their homeland and made their way across Northern Europe, ultimately to settle in what is now known as England, circa 5th century. Over the next five hundred years they acquired new words from neighboring Celtic, Roman, and Scandinavian influences, and the changes that took place in the language they spoke gradually made it look less and less like the Germanic language they began with, and more and more like the English we speak today. In the same way, the German we know today developed out of very different changes in sound and vocabulary (among other things) taking place in the tribes' homeland.

If two groups of speakers, starting out with the same, shared language, can end up speaking two different languages after several hundred years, how can we hope to figure out whether any two languages are related? Well, the one place we might begin is with words that are *least likely* to change. Typically, the best candidates for analysis are core vocabulary words, such as those used in daily life (i.e. counting numbers, the words for family members such as *father* and *brother*, pronouns such as *I* and *we*, etc.). This is because, in part, this vocabulary is fairly stable. Though you might add new meanings to *brother*, its original meaning, "male sibling," is likely to remain the primary meaning. Although some new word could be introduced to take its place, it is difficult to imagine the circumstances under which this would happen. It is a word that represents one of the basic human relationships, and it is a word that a child learning the language will acquire early on and make extensive use of. Once a word for that relationship becomes established, it would take substantial effort or an extraordinarily long time to undergo change. As the concept it represents is not likely to disappear, the word is also protected from simply being forgotten, as *Tupperware*® will someday be. There'll probably always be brothers; the same can't be said for that particular brand of plastic container.

Core vocabulary words like *brother*, then, are most likely to be passed on from a parent language to one of its offspring. Words that appear in a later language that aren't passed on from its parent are typically words that deal with the things that change, such as technology and environment. Thus we are immediately suspicious of words like the Polish *komputer*, because this particular piece of technology is very recent, and so we would not expect the word to trace back to some early parent language that English would also have in common. On the other hand, we do find traces of very ancient words for wheel and axle that were passed down from one major parent language to a number of modern-day daughter languages. In this case, because the technology in question is so very old, we are not surprised to find that all of the languages that came after its development (among one group of people) have words that for it that derive from the same source.

Once we have a basis for figuring out which words were probably inherited by a language from its parent, as well as which words were probably acquired later on, either by borrowing from another language (another example: Japanese *biru* for beer) or by coining a new word (*yuppie*), we can begin to look for cognates. If I suspect that English and Latin share a parent, I am likely to begin comparing their words for father, for example:

English	Latin
father	pater

If I look at enough other potential cognates between the two languages, including *brother-frater* and *mother-mater*, I may find that in addition to consistent patterns of sounds such as *a-er*, there are regular substitutions of *th* for *t* between languages. Given this much regularity, I have good reason to suspect that both languages share a parent somewhere in history, because their words for key members of the family unit follow very similar patterns. And, as it turns out, I would be right. Latin and English, strange as it may seem, both derive from a language we have no written record of, but linguists have named Indo-European.

Language Change: A Writing Perspective

The 19th-century American writer Washington Irving, who is best known for his stories "The Legend of Sleepy Hollow" and "Rip Van Winkle," composed an essay on the relationship between language change and literature. Titled "The Mutability of Literature," Irving's essay presents a novel argument for the benefits of language change. Set up as the record of a dialogue between Irving and an antiquarian book, we find Irving attempting to convince the old book that it isn't so bad that no-one reads him anymore. Irving tells the book:

I consider this mutability of language a wise precaution of Providence for the benefit of the world at large, and of authors in particular. To reason from analogy, we daily behold the varied and beautiful tribes of vegetables springing up, flourishing, adorning the fields for a short time, and then fading into dust, to make way for their successors. Were not this the case, the fecundity of nature would be a grievance instead of a blessing.

Irving continues the analogy, comparing literature to vegetation:

Language gradually varies, and with it fade away the writings of authors who have flourished their allotted time; otherwise the creative powers of

genius would overstock the world, and the mind would be completely bewildered in the endless mazes of literature.

In other words, we should be grateful for language change, because otherwise we'd be overrun with genius. Of course, we might note that Irving's own language here, dating to the mid 19th-century, is beginning to fade from use; for example, the form taken by the phrase "Were not this the case," is uncommon in present English usage. Certainly his essay is little read outside of academia; indeed, most people probably know his two most popular stories only through television, movies, and children's adaptations. Did Irving have his own writing in mind as he wrote this essay?

By studying the ways in which human beings acquire language, as well as the ways in which languages change through time, we have some understanding of both how language works as well as why we can't always understand each other or those who have written before us. We have also suggested that human language is intimately tied to human development. Now we might ask the question: how is it different from other, non-human languages?

Typing Monkeys and Dancing Bees: Non-Human Language

You may be familiar with some or all of the following: Dolphins have complex means of communicating acoustically through water. Ants use pheromones to provide directions to fellow ants. Bees "dance" in air to tell their comrades where to find nectar. Chimpanzees and gorillas have learned sign language. Bonobos can "speak" using a keyboard and speech synthesizer. And, of course, in movies and sitcom episodes, trained parrots say very funny things at just the wrong moments, advancing the plot with their comic intrusions. Are all of these examples of language? Perhaps, if we define language as the means by which two members of a species communicate (or even more broadly, the means by which any kind of communication between any two entities, human or otherwise, takes place). However, if we look more carefully at what distinguishes animal communication from human language, we can highlight some important features of the latter in the process.

Let us take the dancing bee to begin with. After discovering a source of food, a given bee can return to its hive and perform dances (particular patterns of flight) that convey to its hivemates the presence of that food, how rich it is, what kind of food it is, and where it is. Pretty impressive, eh? Well, it is. But it also has several limitations, one of which is the fact that this bee language lacks any means of communicating up or down. That is, if a food source is located at a height above that which bees are accustomed to travel, no bee is capable of indicating, "look up." In part, this makes sense, as most sources of food for bees are going to be within a particular range of heights from ground level. Evolutionarily, their language is suited to describing the majority of food sources bees will encounter. However, the downside is that their language has no means of expressing new ideas. That is, except for the few features already described, bee dances cannot communicate anything else, no matter how useful the information might be. This is the central problem with all known animal languages: they are not what linguists call *productive*. That is, they cannot take the elements ("words") that already exist and recombine them or create new ones to express new ideas or information. If the bee language has means of talking about just four features of a food source, those are the only four features any given bee will ever be able to talk about (unless, over the course of

evolutionary history, this changes). In contrast, all human languages are highly productive. We can combine our nouns and verbs in whatever way we believe will communicate what we have in mind.

The flexibility of human languages has another interesting result: every language is capable of infinitely long expressions. Take, for example, the opening sentence of a familiar children's story:

This is the house that Jack built.

Now, let us extend it a bit, as the story goes:

This is the cat that ate the rat in the house that Jack built.

And again:

This is the dog that chased the cat that ate the rat in the house that Jack built.

How long can we go on? Well, our language permits us to extend this sentence to the point of exhaustion and beyond. More to the point, the fact that we can extend our utterances to such length enables us to express complex relationships. I can actually ask you to return the stapler that you borrowed last Christmas when you were having that terrible toothache, and be fairly sure that, if you were listening, you won't give me back the stapler that you borrowed last Christmas when you were having that terrible headache. After all, I did prefer the first one. Further, if we get tired of these language games, we can begin talking about things that don't exist:

My purple goat plays the piano prettily with his oars.

So not only do non-human languages like those of bees make it impossible to express previously unexpressed real-world relations such as "up" and "down," but they are that many more steps removed from articulating concepts that don't have any direct real-world counterparts. And while you might object that my purple goat doesn't serve any useful purpose, the fact that our shared language permits me to say

If your writing doesn't improve, I'll sic my purple goat on you

serves as a case in point where my ability to talk about things that haven't happened yet in conjunction with things that can't happen can nonetheless communicate *very* effectively. Indeed, the fact that we can think of and express hypotheses about future events and alternative worlds is, one might argue, essential to our species. In other words, we are not limited to dealing with reality as we experience it. We can project a better world through words in order to convince others to help create it. Of course, our ability to express the impossible also provides us with a great deal of entertainment in the form of stories about men blowing up asteroids and awkward, unpopular boys who actually get the girl.

What about teaching animals, specifically apes, to use a human language such as sign language? While the results thus far have told us a great deal about the cognitive capacities of apes and other mammals, as far as successfully establishing communication between a non-human species and humans, well, you may judge for yourself. In what was billed as the first-ever "interspecies chat," the public was given the opportunity to communicate with Koko, a 26 year-old ape trained in sign language. Equipped with a

vocabulary of some 200 signs, and with her trainer, Dr. Francine "Penny" Patterson, serving as translator, Koko had a conversation which included the following:

Question: Koko, are you going to have a baby in the future?

Koko signs: Pink

Patterson explains: We had earlier discussion about colors today.

Question: Do you like to chat with people?

Koko signs: Fine nipple.

Patterson explains: Nipple rhymes with people, she doesn't sign people per se, she was trying to do a "sounds like..."

Question: Does she have hair? Or is it like fur?

Koko signs: Fine.

Patterson explains: She has fine hair.

Question: Koko, do you feel love from the humans who have raised you?

Koko signs: Lips, apple give me.

Patterson explains: People give her her favorite foods.

It is painful to contemplate the efforts Patterson makes in order to bend Koko's responses to fit the questions they are supposed to answer. And, to be sure, it is not completely her fault. The stakes are high in demonstrations of this kind, and, given what we have said about the infinite complexity of human linguistic expressions, it is begging for trouble to try and establish a freewheeling question-and-answer session in which one of the participants is limited to two hundred signs for understanding and answering a question, and the others have vocabularies numbering in the tens of thousands, with potential combinations of those words numbering well beyond what the average mind can imagine. Nevertheless, this calls attention to the limitations of teaching human languages to nonhumans, as well as to the fact that even what little teaching we can do gives us little insight into what other animals actually think. That is, they don't use our languages the way we use them.

We can conclude this chapter by focusing on what researchers in the field currently understand about human languages:

- 1) Every normal human being is capable of acquiring a language
- 2) Language acquisition is a normal part of the developmental process
- 3) Language is a product of, and requires, both genes and culture

- 4) Languages are always in a process of change
- 5) Because languages are always changing, new languages can develop out of older languages when speakers of one language lose regular contact with others who speak the same language.
- 6) Human languages are very different from animal languages for several reasons:
 - a. Potentially infinite length of utterances
 - b. Productive: can combine in ways to express new ideas
 - c. Can express situations and ideas that do not correspond to reality

In the next chapter, we will look at how the above principles enable us to better understand the function of language in the everyday world we meander through. Our scope will shift from centuries to decades, and from countries to regions, as we examine the differences we register, in a social context, between kinds of language and language users.