three

chapter three

Language Acquisition: Perspectives, Development, and Relation to Thought

Theorizing language can be dangerous. Or, on the other hand, illuminating. It may be spelled with an "s" instead of a "z." Or it might be just the last book you ever read on the theory of language.

Taylor (1997, p. 1)

Within three years of birth, children acquire several thousand words, figure out how to build and understand complex sentences, and master the sound [or phonological] system of their language—all before they can tie their shoes.

O'Grady (2005, np)

KEY CONCEPTS

After completing this chapter, you should have a basic understanding of:

- Selected broad theoretical frameworks of language—environmental, cognitive-linguistic, and social
- The prelinguistic and linguistic developmental stages of language in early childhood
- Views on the relation between language and thought

It is time, again, for you to think of questions. Consider the major topics listed above. You might wonder about the broad theoretical frameworks. What is an environmental framework? Cognitive? Social? Are these frameworks

mutually exclusive? Why do individuals attempt to develop theories? Related to the second topic, you might ask yourself: What are the stages of language? Is prelinguistic different from linguistic? Now we come to the relations between language and thought. This might seem strange to you. You can ask: What does it mean to say that there is a relation between language and thought? What exactly is *thought*? Can one really have one without the other? These are only a few questions. You will think of more as you read along. I hope that you will find answers to your questions by the time you finish this chapter.

It is axiomatic to state that the acquisition of a first language (indeed, any language) seems to be magical. With little difficulty, most typical children learn the language(s) of their society, that is, the one or ones to which they are exposed. It is amazing what children can do by the time they are 3 years old—as indicated by the passage at the head of this chapter.

This language acquisition process appears effortless and relatively simple. However, if one were to conduct an in-depth analysis, one would discover the complex and intricate nature of acquiring a language. Typical children's ability to understand and produce a spoken message or deaf children's ability to understand and produce a sign message is limited primarily by the extent of their linguistic and cognitive development (Chomsky, 2006; McGuinness, 2005; O'Grady, 2005).

Chapter 1 presented some basic information on the nature of language, approaches to studying it, and a discussion of its major components. This seems to be a good place to expand on these areas, especially on the three broad theoretical frameworks mentioned in that chapter: cognitive (or cognitive-linguistic), social, and environmental. It is hoped that this will not be the last chapter (or book!) you read on theories of language. I agree with Taylor (1997) that "Theorizing language can be dangerous" (p. 1). It can also be frustrating, incomplete, and represent a malady known as academic hairsplitting. Of course, the sentence "Theorizing language can be dangerous" has more meanings than the one I presented in the previous chapter: "Visiting professors can be dangerous"!

Why, you might ask (and maybe you did at the beginning), do we even bother to develop a theory of language, especially if it is difficult and full of controversies? Of what use is this to practitioners such as teachers or clinicians? It would take another book to address these questions adequately, but I can provide a few points here. During Chapter 2, I attempted to show that a good language teacher is one who knows *a lot* about the structures and functions of language as a discipline as well as one who knows about the characteristics

of the children with whom she or he is working. In fact, an understanding of the basic processes of language can lead to one of three general approaches: prevention of major language problems; remediation and intervention based on general developmental guidelines; and enrichment—that is, development of an environment that enriches or facilitates the development of new language (or literacy) skills (see discussion in Pence & Justice, 2008).

By the end of this chapter, you should appreciate the attempt to theorize language (as well as to theorize the relations between language and thought) because it provides insights into the following questions:

- What does it mean to discuss environmental, cognitive, or social factors?
- Can language be taught *or* developed or taught *and* developed?
- What is the relation between language and thought?
- Is there a relation between theory and practice?

Everyone has a story or two about the use of language by children. Occasionally, these stories provide glimpses into the minds of children; other times, they offer evidence for the creative use of words and sentences. More often than not, we can obtain some understanding of the processes that children use when they are trying to make sense of the world via the use of language. Making sense is an activity in which all children are engaged, whether they are typical or not. Children are indeed little linguists—of course, some are better than others. This is also true for adolescents and adults.

Language is a tool for communication and thought—two of the most prevalent functions discussed in Chapter 2. Consider the following scenarios taken from my experiences as a classroom teacher and as a father, which exemplify these functions, albeit in interesting ways.

Scenario 1

I was teaching children who were deaf/hard of hearing and who were 10 to 12 years old. On this day, the five children were sitting in a group, taking turns reading a story about a boy who was fishing in the river. One boy in the reading group started to read: "The boy sat on the bank of the river. He reached for a worm in his box." The boy who was reading the passage stopped reading and looked at me with a horrified expression. I signed to him: "What's wrong?" He asked, "Where is the bank?" Being the conscientious teacher that I thought I was, I promptly ran my finger along the edge of the

picture of the river in the book. In fact, I ran two fingers—one on both sides of the river. Then, I signed: "That's the bank." Instead of giving me an okay, satisfied look, this little deaf boy broke down and cried. Apparently, his understanding of the word *bank* was limited to a place where you store or save money. No matter how hard I tried, this little boy refused to accept the fact that land beside a body of water, particularly running water as in rivers, brooks, canals, and so on, was also called a bank. In fact, everyone else in the reading group rejected this meaning for the word *bank*.

Because of this, I decided to do a whole lesson on land beside a body of water. Think of the challenges of explaining *bank*, *shore*, *coast*, and *beach*. Think of the need to discuss additional meanings for *shore*, *coast*, and *beach*. Eventually, you will have to explain that one can play with a beach ball when you go to a lake. That is, a beach ball is a beach ball whether you use it at the lake or the ocean or just in your backyard. I did all of the above and more, but I was only moderately successful. I don't really think these children *believed* me. Perhaps they had what has been called word rigidity or meaning rigidity. For them, a word has only one meaning. Given what I knew about the English language, I knew that these children were in for a big shock.

Scenario 2

Even children with multiple disabilities—like my son—have a tremendous desire to communicate and to understand the tricky business of making sense via language use. This desire to communicate is so strong that when my son is frustrated, he whines and, occasionally, lashes out at me physically, as if I am the cause of his breakdowns in communication. Of course, I learned quickly that lashing out *is* communicating. The goal is always to assist my son in replacing it with more constructive behavior. Easier said than done, even with the use of a computer device with pictorial icons. My son is now a whiz with this communication device. Strictly speaking, he might not be learning a full-blown language or even coming close to it, but he is communicating.

Sometimes the message is not always clear-cut—not for him, but for me. Basically, he expects me to fill in the blanks and becomes frustrated when I don't get it. For example, he might quickly bring up the icons with accompanying speaker-voice messages that say: "Grandma, Erie, WQLN." Well, his grandma lives in Erie, Pennsylvania, and when we visit her, my son dashes to the television and turns on WQLN (which is a Public Broadcasting

Service [PBS] station in Erie). The challenge becomes this: Does he want to go to Erie and see Grandma and WQLN? Is he telling me that we have visited Erie and seen Grandma and WQLN in the past? Or is he simply rehearsing the thoughts in his head, similar to what we do when we reminisce about the past or think about the future?

Regardless of the underlying reason, these are interesting opportunities to have a dialogue with him, but only on his terms. For example, after eating dinner, I might ask him: "What time is it?" If it is 7:00, he says "Jeopardy"—which is the show that is on at 7:00 p.m. in our area. So I take this to mean that "Since it is 7 p.m., it is time for me to watch Jeopardy." Perhaps this is too rich of an interpretation. Likewise, the question "What day is it?" will elicit a response that reflects his highlight of the day. So, if it is Monday, it is Speech and Large Band-aid Day (let's forget the explanation for this phenomenon for now). Admittedly, my son is using bits and pieces of language to communicate, and he also does this when answering questions, driving in the car and identifying objects, and so on. It is a challenge to communicate with him and a joy to watch his overextensions and underextensions—even at age 17. No matter what—this is a heck of a lot better than defending myself against his aggressive behaviors.

How do these two scenarios relate to the theories or models of language or to the developmental milestones (discussed later)? What about the relation between competence and performance or between language and thought? Let us proceed to the discussion of theoretical frameworks and see whether I can provide some answers.

THEORETICAL FRAMEWORKS OF LANGUAGE

In Chapter 1, it was decided to group language theories into three broad areas: environmental, cognitive, and social (e.g., see Lund, 2003). Similar to the use of any other framework, this decision is typically based on the interpretation of the individual who proffers categories. That is, other scholars may select different categories, and still others may prefer not to use all-encompassing categories. For example, Pence and Justice (2008) presented the following list of language development theories in their book: behaviorist, social-interactionist, cognitive, intentionality model, competition model,

usage-based theory, modularity, universal grammar, syntactic bootstrapping, semantic bootstrapping, and connectionist theories. Then they proceeded to discuss these models with respect to concepts such as nature versus nurture, the mechanisms that drive language acquisition, and types of input to support the language-learning system. In a previous edition of this book, I used behaviorism, linguistics, and interactionism—covering both social interactionism and cognitive interactionism (Paul, 2001). Within the interactionist framework, I discussed several variations, such as the information-processing, connectionist, and competition models. This schematic plan, of course, is debatable.

There is no doubt that discussing theories and models and trying to show the connections between different frameworks is a complex and complicated endeavor. However, the task can be simplified if we synthesize the categories of both Lund (2003) and Pence and Justice (2008). In essence—and I am certain that other scholars would disagree with me—it is possible to argue, due to overlapping features, that all language theories and models can be placed in one of the three broad categories mentioned previously—environmental, cognitive (or cognitive-linguistic), and social—or seen as combinations of aspects from these broad categories. This framework suits my purposes for this chapter.

Regardless of how it is done, why do we theorize about language? On one level, the attempt seems to be to describe the relevant processes and mechanisms that account for language development. In my view, Chomsky (1957, 1965, 2006) offers the best reason for theorizing language: to achieve explanatory adequacy. That is, a good theory is one that is adequate in explaining the acquisition of language—in a scientific, empirical manner. This simple statement begs the question: What does it mean to provide an adequate explanation of language acquisition? Unfortunately, that requires another book; however, some insights into this notion are provided in this chapter via the discussion of the three groups of theories.

Practitioners are almost always interested in the applications of theories, especially if this leads to successful outcomes, assuming that there is a consensus on the nature of success and of outcomes. Despite the difficulties of proceeding from theory to practice, numerous individuals wonder whether we have a coherent theory of language acquisition. If not, will we ever have a coherent theory? Can this theory account for individual differences (see Dabrowska, 2004; Shore, 1995)? More specifically, do individual differences undermine the task of developing a general model or theory?

Thus far, despite advances in our understanding, the development of a comprehensive, coherent theory is still elusive, and this, no doubt, presents enormous challenges for our language intervention, teaching, and facilitative endeavors. A number of language scholars are still mystified by the language acquisition process and seem to still view the process as being somewhat magical or mysterious (see Bohannon, 1993; Crystal, 1987, 1997, 2006). Other scholars believe that the process of science should yield an even greater and deeper understanding of language acquisition (e.g., Dabrowska, 2004; Lund, 2003; Pence & Justice, 2008). This discussion is surely no small comfort to educators, parents, and interested others attempting to improve the language acquisition process of many children who are deaf and hard of hearing.

To assist you in understanding some basic information, **Table 3-1** illustrates, in general, the background and organization of the three broad groups of theories mentioned earlier—environmental, cognitive-linguistic, and social. The table delineates a few major similarities and differences with respect to dichotomies such as functionalism versus structuralism, performance versus competence, and empiricism versus nativism. Some of these dichotomies are discussed in the ensuing sections on language theories, so you may wish to return to this table. At the end of the discussion of each theoretical group, I present additional, specific information in a summary table.

ENVIRONMENTAL THEORIES (BEHAVIORISM)

It is permissible to think of environmental theories as a reflection of the overall framework of behaviorism (e.g., Lund, 2003). For the most part, these models are silent on whether there are innate capacities of language learners—thus, they strongly favor a nurture approach to language learning. The major focus of these theories seems to be on the development (acquisition) of words and grammar by children. The teacher and the environment (classroom, etc.) are viewed as playing critical roles in the child's learning of language. Obviously, proponents of this model believe strongly that language can be taught—in fact, it is a *learned* behavior. Because behaviorist or environmental theories still exert a considerable influence in the field of special education—including the growing interest in children with autistic behaviors—it is important to ensure that you have a basic understanding. I will let the cat out of the bag in a hurry and not keep you in suspense. Environmental theories, in my view, do not offer adequate explanations of the language acquisition process. Nevertheless, some aspects of the environment are critical (for different reasons), so let us not throw the baby out with the bath water.

Table 3-1 Background and Organization of Language Theories

One feasible way to view the three broad groups of language theories (environmental-behavioral, cognitive-linguistic, and social) is to show how they relate to the following dichotomies: functionalism versus structuralism, performance versus competence, and empiricism versus nativism.

Dichotomies
- *Functionalism* examines relationships between environmental variables and language development—that is, the pragmatic use of speech sounds, words, and sentences. Emphasis is on communicative contexts or situations in which language is used.
- *Structuralism* focuses on invariant processes and mechanisms that undergird observable language data. The form or organization of language behavior that is common across individuals and situations is important. Structuralists use formal language or symbolism to describe language data.
- *Performance* refers to the various instances (words, sentences) of language users. That is, this refers to the performed (spoken, signed) acts of language users.
- *Competence* refers to the knowledge of language users (i.e., abstract knowledge) or to the underlying rule system based on data from theoretically possible language usage (e.g., grammatical usage) as opposed to only the error-prone data from the actual performance of the language users. Performance data are considered, but only in light of competence models.
- *Empiricism* emphasizes the influence of the environment in fostering the acquisition of language. Proponents argue that language behaviors are not much different from other types of learned behaviors or skills. A complete model of how language is acquired can be developed by observing the use of language in social interactions. That is, all of language is learned.
- *Nativism* asserts that language is too complex and is acquired in too short a time to be learned. Although language needs an environment in which to flourish, the environment, including any known methods, is not essentially responsible for language development. It seems that some critical components of language must be innate (i.e., inborn) to permit its rapid development with minimal, reasonable exposure. This explains why language users can understand and produce utterances to which they have never been exposed.

Application to Language Theories
- Many theories within the three broad groups cannot be placed solely at one end of the continuum of the various dichotomies. For example, Piaget's theory embraces cognitive structuralism, but, instead of nativism, the focus is on the biological development of cognitive structures. A particular theory might be representative of one end, but cannot be pigeonholed into it. For example, both environmental theory and most of cognitive-linguistic theory subscribe to structuralism, although their research approaches differ. These two groups differ markedly on other dichotomies. Environmentalism or behaviorism espouses the notion of performance and empiricism, whereas most of cognitive-linguistic theory favors competence and nativism.

Table 3-1 (continued)

• *Interactionists* represent a rather broad group with several factions, depending on the nature and extent of reactions against both environmentalism-behaviorism and cognitive-linguistic theory, as influenced by Chomsky. In general, interactionists acknowledge interactions among a number of variables, such as cognitive, social, linguistic, biological, physiological, and environmental. Cognitive-interactionists may emphasize the predominant importance of cognitive or biological factors (i.e., structuralism), which influence their interpretations of nativism (i.e., as biological development rather than innate language structures as in Piaget's model). Social-interactionists focus mostly on social factors (e.g., pragmatics, communicative interactions, environment) to explain the acquisition of language (i.e., functionalism). Some interactionists, notably information-processing theorists, use a computer metaphor to explain acquisition, whereas others focus on neurophysiological components of the brain to account for language development. In general, it is possible to state that interactionism oscillates between the bipolar continua of the three dichotomies.

Environmental theories have been influenced by the behaviorist framework, which posits that only observable behaviors are capable of being studied and, consequently, measured. The intent here is to discuss the general tenets of environmental theories, specifically those that relate to language development. Because of the emphasis on observable data, environmentalists or behaviorists are interested in the associations or connections between environmental stimuli (empiricism) and the language behaviors of the child (performance).

Two general processes describe these associations or connections: classical conditioning and operant conditioning (e.g., Skinner, 1957). Typically, language (mostly vocabulary) and an additional learning principle, that is, operant conditioning, account for productive speech. These two processes assume that all behaviors are learned and that there is little or no need for the concept of innate structures. To assist children in the learning of language behaviors, it is necessary to break down complex structures into more manageable, simple structures. Thus, learning proceeds from the simple to the complex in an accumulative fashion (see also the discussion in Phillips & Soltis, 2004).

Classical or Respondent Conditioning

One of the most well-known examples of classical conditioning (also known as respondent conditioning) is the experiment of the Russian physiologist Pavlov, who was studying digestion in dogs. Pavlov noticed that his dogs

would salivate when food was brought to them. Not hard to imagine. Whenever my wife mentions the word *turkey*, I tend to salivate even though we are not eating turkey for dinner. Back to Pavlov. In his experiment, Pavlov found that the sound of a bell, when associated with the presentation of food several times, became a stimulus—that is, a conditioned stimulus (CS). The bell, by itself, was a neutral stimulus, which did not originally elicit the salivation of a dog. After the experiment, the ringing of the bell, alone, elicited the salivation of the dog (see the accessible account in Cooper, Heward, & Heron, 1987). The dog had learned (or had been conditioned) to salivate by responding to a new stimulus—the ringing bell.

We can illustrate this relatively simple process through the use of a diagram called the *S-R paradigm*. *S* refers to the stimulus and *R* to response, and the symbol → refers to the act of eliciting or producing. For example, in Pavlov's experiment:

Stimulus (food) → Response (salivation)
S → R
Natural Stimulus (food) plus Conditioned Stimulus (bell) → Response (salivation)
Finally, Conditioned Stimulus (bell) → Response (salivation)

There have been attempts to relate this type of behavior to the early language-learning behaviors of infants in response to words uttered by significant others, particularly mothers (e.g., Bohannon, 1993; Lund, 2003). Bohannon (1993) provided an example that focuses on an infant's learning to respond to the word *milk*, which becomes a conditioned stimulus (CS) when associated with the substance milk.

Milk (UCS [unconditioned stimulus]) fed to a hungry infant usually results in physiological responses in the infant (UCR [unconditioned response]). When the infant's mother says the word *milk* prior to or during feeding, this word (CS [conditioned stimulus]) becomes associated with the primary stimulus of the milk and gradually acquires the power to elicit a response (CR [conditioned response]) in the child that is similar to the response to the milk itself.

Once a CS (a word) has come to elicit CR, it can then be used as a UCS to modify the response to another CS. For example, if a new CS, such as the word *bottle*, frequently occurs with the word *milk*, it may come to elicit a CR similar to the response to *milk*. The associations formed between several stimuli (CSs) and a single response lead to the formation of associations between the stimuli themselves.

Thus, not only may arbitrary verbal CSs be associated with specific internal meanings (CRs), but the words themselves may be connected by stimulus-stimulus associations. In this way, classical conditioning is used to account for the interrelationship of words and word meanings (p. 246; words in brackets added by present author).

Operant Behavior and Operant Conditioning

Whether the above description by Bohannon regarding respondent behavior (i.e., the S-R, or respondent, paradigm) and classical conditioning is accurate is debatable. Many current environmentalists and behaviorists agree with Skinner (1957), who argued that most human behaviors cannot be accounted for or explained by the S-R paradigm. Rather, what is needed is an analysis of operant behavior and operant conditioning. According to Skinner, operant behaviors are not elicited by preceding stimuli; they are influenced by stimuli that follow the behavior.

Consider the following example. To account for the child's production of speech, the principle of operant conditioning entails the notions of imitation and reinforcement used by parents. The parents provide a language model for the child. The child is rewarded after a successful imitation of the model, moving from simple sounds to more complex speech. This process is called *shaping*, which results in the acquisition of the desirable behaviors.

Bohannon (1993) offered an eloquent description of operant conditioning (see also Moerk, 1983, and Phillips & Soltis, 2004) and argued that the basic processes of learning, that is, classical and operant conditioning, are responsible for the development of the child's verbal behavior. With respect to operant conditioning, Bohannon (1993) remarked that:

> Operant conditioning concerns the changes in voluntary, nonreflexive behavior that arise due to environmental consequences contingent upon that behavior. Simply put, behaviors that most frequently result in rewards tend to be repeated, whereas behaviors that result in punishment do not tend to recur. All behavioristic accounts of language acquisition assume that children's productive speech is shaped by differential reinforcers and punishments supplied by environmental agents (e.g., parents). Behaviors assume that children's speech that more closely approximates adult speech will be rewarded, while meaningless or inappropriate speech will be ignored or punished. Gradually, the response unit will change from simple sounds to whole words as the parents change their reinforcement practices, eventually restricting rewards to only those utterances that are meaningful and adultlike (p. 246).

Proponents of these environmental or behaviorist models tend to favor concepts such as modeling, task analysis, program learning, precision teaching, or direct teaching, which entail the use of reinforcement and imitation (e.g., Cooper, Heward, & Heron, 1987; Phillips & Soltis, 2004). A number of examples from effective teaching and learning situations can be provided. Let us consider the concept of prompts as part of the shaping process to assist the child in producing a correct response. Polloway and Smith (1992) discussed four types of prompts that can be used by the teacher in classroom settings (p. 139):

1. *Imitative prompts*, or *modeling*, provide the child with a demonstration of the correct behavior to follow. For example, the instructor may say, "Touch your knee," and then perform the action himself or herself.
2. *Verbal prompts* are useful when the teacher wishes to highlight the stimuli presented to the child without using physical guidance. These prompts make the appropriate response more apparent and minimize error. An example of a verbal prompt is the use of voice inflection to help a student select the correct response (e.g., "Is this the *ball*?"). Another form of verbal prompting is the teacher's use of simple, explicit directions.
3. *Gestural prompts* are those in which the teacher uses hand and body movements to direct the child's response, to achieve learning without errors. Examples of gestural prompts are pointing, waving, and nodding.
4. *Physical prompts* require the teacher to assist the child by providing either full or partial manual guidance to successfully complete the activity. Physical prompts can be used to assist in receptive motor activities such as hand-raising or jumping or to elicit a verbal response by helping a child form his or her lips to make a specific speech sound.

Critique of Environmentalism or Behaviorism

Despite its critics, the teaching implications of environmental theories can be and have been shown to be effective for some children, many of whom have learning problems or disabilities. The techniques appear to be simple and are easy for teachers to learn and apply in their classroom situations. Learning is actually conceived as a positive change in behavior and even as a reduction of antisocial or negative behavior. With a systematic design of reinforcement established, a number of children can proceed at their own pace with immediate feedback, which, in itself, can be an impetus to continue. In fact, the value of immediate feedback has been supported by other theories (see discussion in Lund, 2003). In essence, everything is transparent and observable;

no special attention is needed for the activity that might be taking place within the mind—according to the environmentalists or behaviorists.

Does environmentalism or behaviorism really provide explanatory adequacy for the development of language and literacy? As with any other group of language theories, it is not difficult to find criticisms and, even setting aside the infamous Skinner/Chomsky debate, there have been many attacks on environmentalism or behaviorism. Only a few remarks are made here. For example, in light of the current prevailing thinking on language development, the notions of imitation and reinforcement play a very small role in the child's production of language (e.g., see Cairns, 1996; Chomsky, 2006; McGuinness, 2005). The imitation and reinforcement paradigm does not account for children's playing with the language, that is, children's inventiveness, even when children seem to know the meaning of a word.

Interestingly, parents only reinforce a small portion of what their young children say, and much of the focus is on the truthfulness of the utterances. In addition, the notion of children's errors needs to be considered in another light. Consider the classic examples of *All gone cookie* and *He goed*. At first glance, these examples are ungrammatical and are not spoken (or reinforced) by typical parents or adult users of the language. These utterances, and others, are understood better with respect to children's progress toward linguistic maturity. That is, these statements represent intermediate steps (e.g., hypothesis testing) in children's acquisition of the grammar of mature language users.

Also associated with environmental or behavioral theories is the notion of *child-directed speech* (e.g., Lund, 2003). That is, there is a special type of language used by parents or significant caregivers with children, and this facilitates learning. Albeit child-directed speech does facilitate language, it does not seem to be necessary for it. The concept of child-directed speech, or some variation of it, was, at one time, an important component of early social theories (particularly social-interactionist) of language acquisition.

Perhaps the biggest criticism of environmentalism or behaviorism is the fact that there seems to be almost no consideration for what the child brings to the language learning task (i.e., the child as thinker or as a knowledgeable person [e.g., Phillips & Soltis, 2004]). This seems to favor a theory of learning in which the child is viewed as a *doer* or *knower*. As a doer, the child needs to use his or her imitation skills—roughly speaking—in order to become a skilled performer—that is, to know how to do things—in this case, speak a language. Practice and drill are part of the regimen of obtaining the know-how or procedural knowledge (e.g., Olson & Bruner, 1996). As a knower, the child needs to be *taught that* or *know that*, which is described as *propositional*

knowledge. In this instance, the teacher (or parent) is viewed as the expert, and knowledge is imparted from expert to learner, often in a didactic, one-sided fashion. In essence the child is viewed as a passive learner having a tabula rasa (blank tablet) for receiving and accumulating information.

Despite the proliferation of a new wave of learning theories based on constructivist principles (e.g., the learner as a thinker, interpreter, or constructor of meaning), it would be short-sighted to dismiss behavioral or environmental theories entirely. At the very least, there might be an occasional need for the use of doer and knower principles, especially within a framework such as direct teaching or precision teaching. To put it naively and simplistically, the question is: What happens when the child does not seem to make progress? Is some form of sequencing or arranging or prescribing critical (and even acceptable) in the overall language learning process? In the chapter on language instruction (Chapter 10), I argue that setting this up as an either-or phenomenon (to teach or not to teach; natural or structural; etc.) does not benefit all or even most deaf and hard of hearing children. Of course, whether using these direct-teaching or other similar approaches really results in the acquisition of a competent level of overall language remains contentious. Nevertheless, despite the presence of practical or useful techniques, it seems that environmentalism or behaviorism, as a theory, does not offer an adequate explanation for language or literacy development (e.g., Medin & Ross, 1992).

Table 3-2 presents some of the major highlights of environmentalism or behaviorism discussed in this section.

Table 3-2 A Few Major Points of Environmental or Behaviorist Theories

- Environmentalists or behaviorists are interested in the associations or connections between environmental stimuli (empiricism) and the language behaviors of the child (performance).
- Two general processes characterize the associations or connections: classical and operant conditioning.
- Classical conditioning is also known as respondent conditioning. The use of classical conditioning has also been referred to as the S-R, or respondent, paradigm.
- It has been argued that most human behaviors cannot be accounted for or explained by the S-R paradigm—what is needed is an analysis of operant behavior and operant conditioning.
- Operant conditioning entails both reinforcement and punishment. Operant conditioning is concerned with voluntary, nonreflexive behavior.
- The two general processes, classical and operant conditioning, assume that all behaviors are learned and that there is no need for the concept of innate structures.

COGNITIVE (OR COGNITIVE-LINGUISTIC) THEORIES

In one sense, it is sometimes difficult to label a theory or model as predominantly cognitive or predominantly social. It is probably safe to say that cognitive models view language as being dominated by cognitive or biological functions and as being capable of developing independently of the environment—social or otherwise. This does not mean that language develops in a vacuum and needs no social input; however, there seems to be a general insensitivity to the environment.

Many cognitive models are nature inspired (e.g., innate capacity, modularity), but some are nurture inspired (e.g., the work of Piaget) and some seem to be both (e.g., connectionist models). Cognitive or cognitive-linguistic models may favor a domain-specific entity for language (e.g., modularity) or be domain general—in fact, there may even be a general cognitive domain (e.g., Piaget's work). To keep this simple (and it really isn't!), we should think of cognitive-linguistic models as focusing on the attributes within the individual that contribute to the development of language.

Despite their variations, many current cognitive-linguistic theories have been inspired by the cognitive metatheory and views of Chomsky (1957, 1965, 1980, 1988, 1991, 2006; see also Bohannon, 1993; Carruthers et al., 2005, 2006). Chomsky (1975) asserted:

> By studying language we may discover abstract principles that govern its structure and use, principles that are universal by biological necessity and not mere historical accident, that derive from mental characteristics of the species. A human language is a system of remarkable complexity. To come to know a human language would be an extraordinary intellectual achievement for a creature not specifically designed to accomplish this task. A normal child acquires this knowledge on relatively slight exposure and without specific training. . . . For the conscious mind, not specially designed for the purpose, it remains a distant goal to reconstruct and comprehend what the child has done intuitively and with minimal effort. Thus language is a mirror of mind in a deep and significant sense. It is a product of human intelligence, created anew in each individual by operations that lie far beyond the reach of will or consciousness (p. 4).

The information in this passage provides the background for the discussion of a few major principles or concepts in this section: theoretical adequacy, innate capacity, and the notion of competence.

Theoretical Adequacy

Chomsky (1957, 1965, 1988, 1991, 2006) proposed that the road to theoretical adequacy consists of answering three broad questions: What constitutes knowledge of language? How is such knowledge acquired? and How is such knowledge put to use? The linguist needs to describe (or catalogue) all behaviors that are a part of language. These language behaviors must be distinguished from nonlanguage behaviors. To reach the next level of adequacy, the linguist needs to identify a finite number of connective principles, which account for (and predict) the appearance of the language behaviors. In other words, the linguist needs to describe what individuals know about language, how they acquire this knowledge, and how they use it. In Chomsky's view, a complete theory of language development must account for both the language behaviors and the processes and mechanisms used by children during the entire language development period. Chomsky's central concept is *universal grammar* (UG), described as "the system of principles, conditions, and rules that are elements or properties of all human languages not merely by accident, but by necessity . . . the essence of human language" (1975, p. 29).

Innateness

Because of the limited, albeit adequate, exposure to language of a child and the time frame in which language is acquired, Chomsky championed the idea of innate knowledge (specifically, an innate predisposition to acquiring knowledge principles). In general, Chomsky believed that humans are born with minds that contain an innate proclivity for a number of different areas (Chomsky, 1975, 2006; see also Cairns, 1996; Steinberg, 1982). The faculties of mind are argued to be independent of one another. Thus, the faculty containing an innate predisposition for language is independent of that containing an innate predisposition for mathematics. In essence, the language innate device is responsible alone for the development of language; knowledge of mathematics or logic is not necessary. It should be clear that Chomsky's theory is a theory of knowledge, not of behavior. This theory is concerned with the internal structure of the human mind.

The foregoing remarks have also influenced the work of Fodor (1983), who proffered his modularity hypothesis, which was motivated by the notion of universal grammar (i.e., Chomsky's theory of language knowledge) and which, itself, has inspired a line of research. The modularity hypothesis has also influenced the thinking of scholars in the area of deafness (see Marschark, Siple,

Lillo-Martin, Campbell, & Everhart, 1997). Fodor's view is that the brain is organized in a vertical manner, with separate modules to deal with specific, localized information. Initially, these modules do not communicate with other areas of the brain, but communication does occur later in development. Despite the influence of this model, it has been criticized because of its inability to deal with complex operations of the brain such as self-awareness and memory.

Interestingly, one of the most vociferous debates has been the modularity versus connectionist one. Connectionist models have been influenced by the work of McClelland, Rumelhart, and the PDP Research Group (1986) and are essentially interactionist (information-processing) models. The connectionist model has stimulated much research in the area of reading, particularly interactive (i.e., schema-interactive) theories with their focus on parallel processing capacities (see Chapter 7 of this text).

Returning to universal grammar and Chomsky, innate knowledge has been labeled the LAD, or the language acquisition device (see the readable discussion in Cairns, 1996). This knowledge becomes functional or operational when it interacts with the linguistic environment. In Chomsky's view, the environment does not shape linguistic knowledge; rather, it activates the innate linguistic knowledge. This issue of what humans bring to the task of learning (specifically, language learning) seems to provide a perspective on Bertrand Russell's (1948) question: "How comes it that human beings, whose contacts with the world are brief and personal and limited, are nevertheless able to know as much as they do know?" (p. 5). Chomsky (1975) offered a compelling, illuminating response:

> We can know so much because in a sense we already knew it, though the data of sense were necessary to evoke and elicit this knowledge. Or to put it less paradoxically, our systems of belief are those that the mind, as a biological structure, is designed to construct. We interpret experience as we do because of our special mental design. We attain knowledge when the "inward ideas of the mind itself" and the structures it creates conform to the nature of things (p. 8).

Competence

Cognitive-linguistic theories of language are theories of language competence (Cairns, 1996; Stevenson, 1988). These theories attempt to describe the abstract system of rules that account for a person's knowledge of language. This rule system must be sufficient to explain a native language user's production and comprehension of a myriad of sentences, many of which she

or he has not heard or read previously. According to Chomsky (1957, 1965, 1975, 1988, 2006; see also Cairns, 1996; Culicover, 1997), this knowledge is not completely evident in the speaker's performance, that is, the speaker's utterances. For example, the utterances of speakers are subjected to memory lapses, false starts, and parsimony. Although many speakers can produce and understand complex sentences of unlimited lengths, they choose to produce shorter sentences. A theory of grammar should describe speakers' knowledge of all possible, permissible sentences, not only sentences that they utter.

Only by appealing to speakers' intuitions can linguists arrive at a theory of grammar. Thus, a competence theory "is designed to account for our ability to decide whether or not a sentence is grammatical" (Stevenson, 1988, p. 8). Essentially, it can be stated that most cognitive-linguistic approaches assume that language contains a fixed structure that is basically independent of language use. This accounts for how a finite set of rules can be used to generate an infinite number of utterances, including novel utterances, which can be understood easily by the native listener.

Competence Versus Performance

A heavy emphasis on the notion that language has a grammar that is separate from or independent of its use plus a different perspective on the notion of nativism (e.g., constructionist [within interactionist perspectives]) have created what can be described as "two distinct fields of language acquisition" (Ingram, 1989, p. 27), which are still prevalent today (see discussions in Dabrowska, 2004; Lund, 2003).

Most language acquisition specialists are linguists; that is, they have received their formal training in linguistics. In contrast, most child language researchers are psychologists (or sociolinguists), who have received their formal training in psychology (or sociolinguistics), with an emphasis on language development. Some of these individuals are also known as psycholinguists. Language acquisition specialists begin with specific linguistic theory (e.g., competence model) and then focus on the problems of language acquisition (i.e., performance data). On the other hand, child language researchers tend to engage in what can be called inductive theorizing; that is, hypotheses are generated from the patterns observed in the performance data of children.

In sum, there are a number of scholars who believe that a complete theory of language acquisition needs to consider both competence and performance (see Cairns, 1996; Dabrowska, 2004; Pinker, 1984). Many child language researchers disagree with linguists on the notion of nativism and the role of the

social environment. Studying the language development of children, especially those with disabilities, has called into question the environment-insensitivity aspects of Chomsky-driven cognitive theories or models.

Dissensions

Cognitive-linguistic theory has evolved significantly since the beginning of transformational generative grammar (TGG). The evolution of the theory has proceeded from standard theory to extended standard theory to government-binding theory (Chomsky, 1988, 2006; Stevenson, 1988). Chomsky felt that the phrase *government-binding* was misleading; thus, *principles and parameters* has become a popular replacement (Culicover, 1997). Another label that seems to be gaining substantial attention is *nativist theory* (e.g., Carruthers et al., 2005, 2006; Lund, 2003).

As discussed earlier, Chomsky based his notions of innate faculties and the competence versus performance distinction on the study of syntactic structures. Many linguists accept the major features of these notions; however, most of the objections (or differences) are due to the emphasis on a syntax-based grammar, which seems to be only remotely related to meaning and even use (Bohannon, 1993; Dabrowska, 2004; Lund, 2003). A number of scholars criticized the fact that Chomsky's early model could generate syntactically acceptable sentences that did not make sense, as in the following example: *Curious green dreams sleep furiously.* These theorists objected to the primary role being assigned to syntax with a secondary role assigned to semantics.

These and related difficulties with Chomsky's early TGG resulted in the beginning of a strong semantic movement with the publication of Lois Bloom's work (1970), based on her analysis of children's language in both linguistic and nonlinguistic contexts. The analysis is called a *rich interpretation* because it proceeds beyond the analysis of words only, which is considered necessary in order to understand the child's intention (or meaning) (see review in Bloom & Lahey, 1978; see also the discussion of the intentionality model). For example, depending on the analysis of the context in which the phrase is uttered by the child, the words *Daddy shoe* could have a number of meanings. The child could say this as she was picking up Daddy's shoe or as Daddy was putting her (the child's) shoe on her foot, and so on (see discussions and examples in Bloom & Lahey, 1978; this may be similar to Scenario 2, involving my son, that I discussed previously). This is an example of different meanings for the same surface structure or utterance, which cannot be understood by an analysis of syntax alone. Arguments for the semantic basis in language have

fueled the development of additional models. This has become the driving force for one type of interactionist view (i.e., cognitive-interactionist) and has influenced cognitive-dominates-language perspectives in the thought/language debates (discussed later in this chapter).

Chomsky's Approach

This discussion of cognitive-linguistic models focused heavily on Chomsky, who has had a dominating influence on language theories. There is another reason for this space allocation—a substantial deal of research and some of the language teaching materials developed for deaf or hard of hearing children and adolescents and still in use today have been heavily inspired by the work of psycholinguistics and Chomsky, as discussed in Chapters 7, 8, and 10.

Consider a language teaching approach based on the Test of Syntactic Abilities (TSA) (Quigley & Power, 1979). I will use one of my favorite sentences:

The boy who kissed the girl ran away.

An early lesson focuses on ensuring that children understand the reference for relative pronouns. For example, in the sentence above, the word *who* refers to a person. In subsequent lessons (see Quigley & Power, 1979), the teacher can provide practice in the following:

- Showing that this sentence contains two thoughts or ideas: *The boy kissed the girl* and *The boy ran away*.
- Showing how the transformation takes place. That is, with practice in the use of relative pronouns and in embedding two clauses or sentences, one ends up with *The boy who kissed the girl ran away*.

The principles above are purportedly based on interpretation of Chomsky's work on how an individual understands the deep structure (i.e., the underlying meaning) of the surface structure (i.e., the sentence itself). I will have more to say about language teaching methods in Chapter 10.

Whether individuals actually use the principles outlined in Chomsky's work for understanding complex syntactic structures such as relativization (e.g., *The boy who kissed the girl ran away*) or passive voice (e.g., *The dog was bit by the cat*) is, of course, debatable. It is also interesting to note that the procedures described in Quigley and Power (1979), indeed in the

entire TSA program, seem to employ a few basic ideas from environmental or behaviorist theories—that is, multiple exposures, imitation, and reinforcement—related to the goal of internalizing the rules of, in this case, syntax. In fact, some exposure (or modeling) or exposure via interaction seems to be necessary for all theories of language development and may indeed be critical for children who are not learning language in a typical manner (e.g., children with language and literacy disabilities).

The nature of the exposure or the exposure and interaction is contentious and is a critical issue in the discussion of language or communication methods in the next three chapters on oralism, sign systems, and American Sign Language. It seems to be clear that children do not need complete and adequate exposures (models) or exposures via interaction all or most of the time, but the reasons for this are still in dispute. Again, it might be that children with language disabilities need more adequate exposures or more adequate interactions than typical children because their language acquisition is more environmentally sensitive than that posited by most cognitive-linguistic theorists (see discussion in Dabrowska, 2004).

Regardless of the shortcomings of Chomsky's works or of related or different cognitive models, there is one notion that seems to have prevailed: once an individual has reached a threshold of understanding or internalization, she or he can *invent* language usage or comprehend sentences or ideas that she or he has not heard or read previously. For example, because I have a good command of English, I can make up or comprehend sentences that I have never heard, read, or written previously. This is reflective of the generative principle, as indicated by the following sentence:

> *The house that Jack built that appears on the corner of two streets that are covered with a tremendous amount of mud that resulted from a downpour of rain that fell noisily last night which was pitched black that resembles . . .* (and so on and on and on)

In my view, and I am certain that Chomsky would agree, the major goal of language instruction (if it is done at all) is to assist children in reaching this level that permits them to invent and understand an infinite number of sentences generated by a finite set of rules. Unfortunately, we may not always reach this goal with a number of deaf or hard of hearing children and adolescents. Nevertheless, this is what language teachers need to strive for because it is impossible to teach all of language (see the analogous discussion for

Table 3-**3** Major Points of Cognitive-Linguistic Theories

• Most cognitive-linguistic theories have been influenced by the views of Noam Chomsky.
• These theories are theories of language competence with a mostly structuralist frame-work. For the most part, these theories attempt to address the internal structure of the human mind. Variations of the theories are based on support of or reactions against Chomsky's major themes involving concepts such as the language acquisition device, universal grammar, competence, and innate structures. Some of the variations result from a shift from syntax to semantics as being paramount for understanding language acquisition.
• Some semanticists assert that it is the development of semantics, not innate structures, that reflects or represents a general organization and pattern of cognitive development—that is, the structure of the mind.
• The debate on the competence/performance dichotomy engendered the development of two broad types of language scholars or researchers. One group of researchers—child language researchers—is concerned primarily with what children say; that is, there is a focus on performance data. The other group—language acquisition scholars—is concerned with linguistic or competence theory, focusing on the competence of users.
• Despite these variations, there seems to be a growing consensus that any complete model of language acquisition needs to consider both competence and performance.

reading and writing in Chapters 7 and 8). One must develop a threshold of understanding so that one can use language to learn via language. This is especially true for the use of literate language—the kind that appears in school content areas such as science, social studies, mathematics, and language arts, as discussed in Chapters 7, 8, and 9.

Table 3-3 presents some of the major highlights of the cognitive-linguistic theories, especially those motivated by and as a reaction to the views of Chomsky.

SOCIAL THEORIES

The models discussed in this section are either purely social models or seem to be a combination of both social and cognitive—that is, social-cognitive or cognitive-social. Nevertheless, in these models, it is clear that the role of the environment, particularly the social-interactive milieu, is different from that described by predominantly cognitive-linguistic models. Instead of merely activating the language acquisition process, social theorists maintain that the social environment is necessary for language development—indeed, it is the driving force or basis for language acquisition.

The strong position of social models posits that exposure to language is not sufficient for language acquisition. That is, children need to interact or have the need to communicate and interact with others (e.g., Dabrowska, 2004; Lund, 2003; Owens, 2004). In fact, there seems to be an innate social structure (e.g., the language acquisition socialization system posited by Bruner, 1975), which accounts for certain social aspects—such as turn taking—emerging prior to the use of speech (or signs).

The term *interactionism*, used in cognitive or social-interactionist models, implies that there are a number of factors—for example, cognitive, linguistic, and social—that are critical for the development of an individual. It is important to emphasize the interactive influences of these factors. For example, language factors influence cognitive and social development. As another example, cognitive and social factors affect the acquisition of language. The interactionist framework has had a marked influence on the thinking regarding the relationship(s) between thought and language (Bohannon, 1993; Cromer, 1981, 1988a, 1988b, 1994), discussed later.

Within the interactionist framework, there are several major approaches (Bohannon, 1993; Dabrowska, 2004; Lund, 2003; Pence & Justice, 2008). One approach, labeled *cognitive-interactionist*, is concerned primarily with the relationship between cognition and language development. This approach is often considered a cognitive-social approach because of its emphasis on the cognitive aspects and has engendered several cognitively based thought/language hypotheses.

Another group of approaches has been influenced by the information-processing paradigm, as exemplified by the use of a computer metaphor. One of the major models has been the PDP, or parallel distributed processing, model developed by McClelland, Rumelhart, and the PDP Research Group (1986), which is also known as the connectionist model (see also the discussion in Pence & Justice, 2008). The notion of parallel processing has replaced the linear or serial processing models, which were quite prominent in early extant reading theories (i.e., as bottom-up and top-down models) until about the late 1970s (see the related discussion in Chapter 7 of this text). PDP has engendered other models, most notably the competition model of Bates and MacWhinney (1987). (For an update, see Fletcher & MacWhinney, 1995; see also Pence & Justice, 2008, for a brief discussion of the above social models.)

The final major approach discussed here, labeled *social-interactionist*, focuses primarily on the relationship between social development and language acquisition (see also Dabrowska, 2004; Lund, 2003). Although this

approach has also contributed to the thinking regarding the relationship between cognition and language, one of its major influences seems to be on theories and research on pragmatics, that is, factors that govern language choices during social intercourse (Bohannon, 1993; Crystal, 1987, 1997, 2006; Ninio & Snow, 1996; Owens, 2004). It is the social-interactionist framework that is most often associated with social theories—in fact, some scholars aver that it is synonymous with social theories (see discussion in Lund, 2003). I present a few basic tenets of each group in the ensuing paragraphs.

Cognitive-Interactionist Models

The major impetus for the cognitive-interactionist position is the work of Jean Piaget on the development of cognition (see readable discussions of Piaget's work in Flavell, 1985, and Phillips,1981). Piaget's thinking highlights two important differences between the cognitive-interactionist and cognitive-linguistic (or specifically, nativist) positions: competence versus performance and nature versus nurture (or rather, a different interpretation of the innate principle).

Similar to cognitive-linguistic advocates, cognitive-interactionists recognize the distinction between competence and performance. However, cognitive-interactionists believe that performance data can provide useful information on the language acquisition process of children. It is argued that the cognitive capacity of children is both qualitatively and quantitatively different from that of the mature adult language user. By observing the performances of children, it is possible to provide a more complete understanding of the road to mature linguistic development. Cognitive-interactionists also believe that the cognitive processes that underlie children's linguistic performance are the same processes that account for children's linguistic competence.

The innate principle was one of the critical topics of a debate between Chomsky and Piaget (Ingram, 1989; Piattelli-Palmarini, 1980, 1994). Chomsky's views on the innate principle (i.e., the LAD or universal grammar) discussed previously have been labeled *maturationism*. Succinctly stated, the maturationist position of innateness posits that linguistic knowledge is innate and becomes functional or operational when the individual interacts with the environment (Dabrowska, 2004; Lund, 2003; Steinberg, 1982). Thus, environmental stimuli activate this innate knowledge; they do not shape or modify it.

Piaget's views on the innate principle have been labeled *constructivism*. The constructivist position assumes that:

> The complex structures of language might be neither innate nor learned. Instead, these structures emerge as a result of the continuing interaction between the child's current level of cognitive functioning and his current linguistic, and nonlinguistic, environment. (Bohannon & Warren-Leubecker, 1985, p. 189)

In this view, language development (as well as other kinds of development) is said to be a part of the overall cognitive development of individuals. Language development may be an independent system; however, its growth depends on the development of cognitive underpinnings. This approach is somewhat compatible with Vygotsky's (1962) notion of inner speech (i.e., symbolic speech), in which thinking dominates or regulates language processes. However, Vygotsky believed that social forces contribute to the existence and growth of cognition, language, and other characteristics of humans (see discussion in "Social-Interactionist Models").

Information-Processing Models

As mentioned previously, one of the most common metaphors of the information-processing paradigm is the computer. The stage-of-processing model seems to be commonly used in the research on deafness (e.g., see Paul & Jackson, 1993); however, there is a trend toward the use of other models (e.g., connectionist, modularity, constructivism), particularly for understanding the relationship between language and cognition in deaf children, and especially for deaf children who use sign (see discussions in Marschark, 2005; Marschark, Siple, Lillo-Martin, Campbell, & Everhart, 1997; Schick, Marschark, & Spencer, 2006). The stage-of-processing model comprises three major components: sensory register, short-term memory, and long-term memory (see **Table 3-4** for a brief discussion of these terms). Much of the research in this area has focused on the organization and representation of knowledge and the retrieval of that information for application purposes. One of the most common themes is that the processing of children is qualitatively similar to that of adults. In essence, children are developing from novice users to skilled users of information, particularly, for our purposes, linguistic information. One robust line of research has been that on the relationship between short-term (i.e., working) memory and reading comprehension (discussed also in Chapter 7 of this text).

Table 3-4 Stage-of-Processing Model

Sensory Register
- There is purported to be a sensory register for each of our senses. In relation to language and reading, much attention has been devoted to the stores for vision and audition.
- Despite the hypothetical large capacity of the sensory register, it can only take in unanalyzed information for about one second. This information will disappear unless it receives focused attention and is transferred to the second stage: short-term (or working) memory (STM).

Short-Term Memory
- Short-term memory is temporary storage, and the amount of information that can be held is about seven plus or minus two units.
- A unit is considered to be a chunk of information and is influenced by the third stage: long-term memory (LTM).

Long-Term Memory
- The strength and efficiency of the relationship between STM and LTM are markedly influenced by the development of a well-established social-conventional language.
- The manner in which information is represented or organized in LTM and retrieved from LTM is a major focus of the bulk of research in cognitive science.
- The LTM of an individual contains that person's knowledge about the world, including knowledge about language, reading and writing. This stored information enables the individual to interpret, understand, and store new experiences.

Note: Additional information can be found in the following sources: Hanson (1989), Medin & Ross (1992), Miller (1956), and Shadbolt (1988).

The critical aspect of the information-processing approach, especially the model by McClelland, Rumelhart, and the PDP Research Group (1986), is that of parallel processing. Unlike serial or sequential processing, in which single operations are performed one at a time in a linear manner, parallel processing involves the performance of multiple operations in a simultaneous fashion. This connectionist model has been used to explain the word identification process in reading and to address the learning of language items such as past tense and other grammatical aspects. As discussed in Chapter 7, this cognitive model (particularly the work of Rumelhart, 1977, 1994) is considered to be more productive than the other serial, linear reading models associated with bottom-up and top-down processing. With the focus on connections and nodes, this view is quite different from that of Fodor (1983), who argued for an independent module for language development and processing.

Social-Interactionist Models

Social-interactionist models emphasize the role of language interactions. The language learning process is facilitated by the critical functions of language— for example, for social communication interactions and making sense of the world in which we live. Social-interactionists assert that language has a unique, rule-governed structure. However, they argue that these structures develop (i.e., emerge or result) from the social functions of language as evident in human interactions. The development of more mature linguistic functions permits the growth of more sophisticated human interactions. Social-interactionists view language acquisition as a complex, reciprocal, dynamic interplay between the child and the social-linguistic environment.

A better understanding of this dynamic interplay may be seen in the following discussion. Consider that cognitive-linguists view children as active processors of language. Because of language's specialized nature, children's development is guided by maturation. The input of significant others is important because this input triggers (sets in motion) the innate structures.

On the other hand, behaviorists view children as passive processors of language information. Children's development is guided mainly by the stimuli and actions (e.g., reinforcement) of significant others, particularly parents. In essence, the input and actions of significant others are totally responsible for children's language development.

By focusing on turn taking and other pragmatic functions (e.g., those associated with speech acts), social-interactionists assert that children's utterances elicit a response from parents (particularly mothers) and vice versa. The social interaction is dynamic and enriching because parents provide the language stimuli necessary for children's language growth. Relative to the competence/performance issue, social interactionists believe that the linguistic competence of children can only be understood by their performance (i.e., understanding and use) within a social context.

It can be inferred from the foregoing discussion that social-interactionists believe that both nature and nurture contribute to the child's acquisition of language. Social-interactionists assert that some experience and training are necessary for children's language to develop. It is also argued that the innate mechanism, by itself, cannot explain children's mastery of language. The following passage exemplifies this position:

> [The] social interactive approach assumes that language development is the result of acquiring grammatical rules. The child is also assumed to bring a number of innate predispositions to the language

learning situation that constrain children in their search for linguistically relevant distinctions. On the other hand, the environment is believed to be almost as constrained as the children, in order to supply children with the types of language experience necessary for development. Language development is viewed as an orderly, although complex, interactive process where social interaction assists language acquisition and the acquisition of language allows more mature social interaction (Bohannon, 1993, pp. 276–277).

Considering social-interactionist models, it can be seen that the major focus seems to be on the pragmatics or use of language (see Chapters 1 and 2). This provides the basis for language-intervention approaches with children with language disabilities within a social-interactive turn-taking framework. I expound more on this framework in Chapter 10, but three short examples are presented here. One is an example of language expansion, and the second an example of a language expatiation technique. The third example reflects the use of a technique on a targeted feature such as pronouns.

Language Expansion Technique

In this technique, the teacher or clinician adds more information to a child's utterance. This can assist in learning syntax if the child pays attention to the newly added features, which have been omitted in his or her utterances. For example, if the child says *Boy run to store*, the teacher or clinician can respond with *The boy is running to the store*.

Language Expatiation Technique

In this technique, the teacher or clinician adds semantic features in response to the utterances of children. This is different from expansion because the teacher or clinician is adding new information to enrich the child's language. For example, if the child utters *A pencil*, the teacher or clinician might expand this to the following: *Yes, this is a long, skinny, yellow pencil*.

Targeted Feature Technique

According to Owens (2004), the targeted feature is "presented frequently while little pressure is placed on the child" (p. 267).

Child:	Mommy made hamburgers. Mommy made 'tator salad.
Speech-language pathologist (SLP):	*She* must be a good cook. What else did *she* make?

Child:	A cake.
SLP:	*She* did? Yummy. Did *she* cook any hot dogs?
Child:	Uh-huh.
SLP:	*She* made a very nice picnic for the family. Did *she* get to play any games or did *she* just work?

Table 3-5 provides a summary of the major points of social language theories, focusing on interactionist features.

Table 3-5 Major Points of Interactionist Theories

- In general, interactionist theories incorporate tenets from both environmental or behavioristic and cognitive-linguistic approaches. This is considered to be a balanced perspective; however, the nature of the balance depends on the specific focus of the model.
- Interactionists maintain that there are a number of factors—for example, biological, cognitive, linguistic, environmental, and social—that interact and are critical for the development of an individual.
- Within the interactionist framework, there are three broad approaches: cognitive-interactionist, information processing, and social-interactionist.
- The cognitive-interactionist approach is predominantly a cognitive approach and is concerned with the relationship between language and thought, influenced mostly by the work of Piaget. Cognitive-interactionists believe that the cognitive processes that underlie children's linguistic performance are also the same processes that account for children's linguistic competence. In essence, this view asserts that language development is part of the overall cognitive development of individuals.
- One of the most common metaphors of the information-processing paradigm is the computer. A great deal of research on deafness has been influenced by the stage-of-processing model, which has three major components: sensory register, short-term memory, and long-term memory. Much of the focus of research in the information-processing paradigm has been on processes, including memory and attention span.
- Some scholars have argued that the real balance between behavioristic and cognitive-linguistic approaches is most evident in the third major interactionist paradigm: social-interactionist. Social-interactionists assert that language has a unique, rule-governed structure; however, these structures develop (i.e., emerge or result) from the social functions of language as evident in human interactions. Language acquisition is said to be a complex, reciprocal, dynamic interplay between the child and the social-linguistic environment. It is argued that both nature and nurture contribute to the child's acquisition of language. Social-interactionism seems to be the most representative or most predominant social theory.

A FEW WORDS ABOUT LANGUAGE DEVELOPMENT STAGES

The development of language is truly remarkable, especially when one considers the major accomplishments within the various language components during the first three years. In fact, as indicated by the passage at the head of this chapter, it is simply astonishing what children know about and can do with language before they even learn to master the skill of tying their shoes (O'Grady, 2005; see also Crystal, 2006; Pence & Justice, 2008). We now understand the critical role of the prelinguistic period—a period in which the precursors for subsequent linguistic features can be observed. It is not difficult to imagine the deleterious effects of a disruption or disturbance during the prelinguistic period on later linguistic and cognitive development of individuals. In addition, it will be clear in the ensuing chapters why the development of a bona fide language as early as possible is one of the major issues facing educators of deaf and hard of hearing students.

A number of remarks can be made about language acquisition stages. In the ensuing paragraphs, I provide only a few highlights of language acquisition within two broad categories: prelinguistic development and linguistic development.

Prelinguistic Development

It is truly remarkable what infants can do with respect to language during the first few months of life (Crystal, 1997, 2006; Gerken, Jusczyk, & Mandel, 1994; O'Grady, 2005; Pence & Justice, 2008). For example, perception-wise, infants can discriminate between speech sounds and, by the age of three months, can respond differently to their mother's voice compared with those of other adult females. This gives a clear meaning—from the infant's point of view—that there is nothing like a mother. Infants are sensitive to the suprasegmental aspects of speech—intonations, pauses, rhythms—prior to the segmental aspects such as the production of vowels and consonants. The rise-and-fall contour of infant vocalization—and their parents or caregivers playing with them—is an important precursor of the later development of sentence types such as statements, questions, and explanations.

With respect to production, infants learn very early about the power of language (Crystal, 1997, 2006; Gerken, Jusczyk, & Mandel, 1994; O'Grady, 2005; Pence & Justice, 2008). That is, during the first months of life, they begin to use their voices to control others and to get them to do things. Think of the various cries and noises infants make when they are hungry, wet or

soiled, tired, sleepy, cranky, and, yes, even bored. These little critters practice and perfect the habitual and significant sounds of their home language(s).

During the first year of life, the child moves around and explores the environment. In fact, it is critical for the child to perform this activity (Crystal, 1997, 2006; O'Grady, 2005; Pence & Justice, 2008). An immovable child experiences subsequent learning difficulties. With this exploration comes the realization that persons, objects, and events are separate from the self. In essence, during this first year, the infant develops the precursors for the language components of phonology, syntax, semantics, and pragmatics. By the end of the first year, with the onset of object permanence and control over the sounds for the first words, the child proceeds into the one-word stage. This begins the linguistic development (Crystal, 1997, 2006; O'Grady, 2005; Pence & Justice, 2008).

Linguistic Development

The first words of the child—similar to the first walk—produce much joy for the parents or caregivers. There is variability in the exact words used within a specific culture; however, these words do tend to refer to objects and events that are present. Of course, it is a challenge to understand what these first words mean! The words can only be fully understood within the contexts in which they are uttered. "Shoe" might mean "Daddy, this is a shoe," "Daddy, see my shoe," "This is Daddy's shoe," and so on, depending on the context. Some of the first words stand for labels, but others represent sentencelike commentaries or instructions (Crystal, 1997, 2006; Gerken, Jusczyk, & Mandel, 1994; O'Grady, 2005; Pence & Justice, 2008).

Some children jump from one word to three or one word to two and so on. Regardless, the two-word combinations are example of early grammatical language—in fact, this is the beginning of syntax or word order. The words are put together to express a child's perception of actions and relationships. During the two-word stage, the child is beginning to acquire an understanding of *subject* and *predicate* (see Chapter 2 for further details). Finally, at the two-word stage, there are two classes of words: content words (e.g., nouns, verbs, adjectives, and adverbs) and function words (e.g., articles, conjunctions, and prepositions). The overwhelming majority of words used during this period are content words; very few function words are used.

Many parents or caregivers often worry about their children's development, especially the milestones (first words, etc.), when they are different from those of the children of their neighbors or other relatives. Nevertheless,

the fact is that there is wide variation in the early phonologic and vocabulary development of children. Interestingly, this development proceeds well beyond the first year and continues to be refined even into the early school years. For example, most of the phonologic rules are acquired by six to eight years of age (Crystal, 1997, 2006; Gerken, Jusczyk, & Mandel, 1994; O'Grady, 2005; Pence & Justice, 2008).

Vocabulary growth is rapid throughout the preschool and school years and is also highly variable among individual children. New words and meanings are not simply added in a serial fashion. Exposure to new words alters and refines the semantic representations of words and meanings and the relationships between words that are present in the child's vocabulary. It is both a pain and a pleasure to children when they recognize that many words may mean more than one thing (i.e., have more than one meaning). Children also use concepts as generalized categories; that is, they classify similarities, differences, and hierarchies (or families) of connected ideas, objects, and happenings. Thinking with concepts develops with language use.

Beyond the three-word stage, there is another explosion of language growth! For example, children's syntactic development consists of using several of the major transformations of the language, such as question formation (e.g., *yes/no* questions, *wh-* questions), relativization (e.g., *The boy who kissed the girl ran away*), and verb processes such as passive voice (e.g., *The dog was bit by the girl*). (See Chapter 2 for further discussions of syntax.) Initially, children use a linear strategy for understanding sentences, such as noun-verb-noun or subject-verb-object. Later, they develop more sophisticated strategies for dealing with hierarchical syntactic structures (again, see Chapter 2).

Examples of early metalinguistic development include playing with and talking about language, analyzing language into components and parts, and making judgments about acceptable versus unacceptable forms. Some children exhibit basic metalinguistic skills by the age of 3 years or younger. By age 4 or 5 years, many children have a significant amount of metalinguistic knowledge about concepts such as *word*, *sentence*, and *speech sounds*. This type of knowledge seems to be critical for early literacy development. It is during this period that children begin to develop segmentation skills (i.e., syllables, phonemes), or, rather, that segmentation awareness begins to emerge. In order for this development to proceed, children need to understand that a *word* is separate from its *referent* (i.e., what it represents). In general, most children internalize much of the grammar of the language by the age of 4 or 5 years, and master nearly all of the grammar by age 9 or 10 (Crystal, 1997, 2006; Gerken, Jusczyk, & Mandel, 1994; O'Grady, 2005; Pence & Justice, 2008).

Final Remarks: Language Acquisition

In sum, the study of language continues to be an important task for scholars, with the obvious need for further development of theory (i.e., understanding) and further improvement of instruction of—for our purposes—English as a first or second language. It is often forgotten that the study of language is also critical for humans to understand themselves and others; indeed, this entity is a critical, defining element of our humanity. Some scholars believe that language is what separates us from other animals, including the primates (see discussions in Chomsky, 2006; Crystal, 1995). It seems that a proficient command of the benefits of language is only possible when language is acquired during early childhood. This raises some rather thorny, uncomfortable questions: What happens when language is not acquired during early childhood or at least by puberty? Does this mean that individuals have not or will not ever develop an important part of their humanity? Without a full-blown language, is an individual *less than human*?

There might not be complete or satisfying answers to the above questions. Nevertheless, in the next two chapters, I present some information that is relevant to these and other questions for deaf and hard of hearing children and adolescents. Before embarking on that adventure, I need to provide a few comments about the relation between language and thought— another critical area for understanding language development.

LANGUAGE AND THOUGHT

It might be difficult to believe that we still do not fully understand the relationships between language and thought (cognition). However, perhaps this is not too difficult to comprehend, especially in light of the ongoing debates on the nature and acquisition of both language and cognition (e.g., Lund, 2003; McGuinness, 2005; Pence & Justice, 2008). Nevertheless, the purported relationship between language and thought has engendered a number of interesting and somewhat imaginative lines of questioning. For example:

- What does it mean to *think*? Likewise, what does it mean to have a language? (We discussed some aspects of the latter question in this chapter previously; see also Chapter 1.)
- Is it possible to think without having a bona fide language?
- Is it possible to understand a concept, cognitively, if there is no word for it in your language?

- Does your view of the world depend on the content of your language?
- Does your view of the world depend on the parameters or structures of your cognition?
- Can individuals really use language competently without competence in thought (cognition)?
- Can individuals really think competently without competence in language?
- Is the relationship between language and thought important for understanding academic achievement in school?
- What is the value of this discussion for language teachers, specifically for language teachers of children with disabilities?

Suffice it to state that there is not *one* relationship between language and thought; in fact, it might be that there are several or many relations. Some of these relations might be relevant to specific domains or categories of language or to specific domains or categories of cognition (e.g., Bates, Bretherton, & Snyder, 1988; Karmiloff-Smith, 1989; for a brief readable discussion, see Lund, 2003). Lund (2003, p. 10) stated that there have been four main views of the language/thought relationship:

1. The language we speak determines or influences the way we think.
2. The way we think determines the use of language.
3. Language and thought are independent but gradually become interdependent during infancy.
4. Language and thought are independent.

The first view is most often associated with Benjamin Whorf, the second with Jean Piaget, the third with Lev Vygotsky, and the fourth with Noam Chomsky.

Language theorists are interested in the linguistic underpinnings of the development of language, whereas cognitive theorists focus on the cognitive underpinnings. These single-directional emphases (e.g., numbers 1 and 2 above) represent what are considered strong views of the thought/language relationships (Cromer, 1981, 1988a, 1988b, 1994). There is also evidence for weak views of this relationship, which seem to include the framework of an interactive relationship (see discussions in Bohannon, 1993; Lund, 2003; Paul & Jackson, 1993). From one perspective, it is feasible to consider nearly all views, except the independent one (number 4 above), as versions of an interactive perspective with qualifications on the strength, direction, and extent of the interaction. However, interactionist accounts seem to be biased

toward cognition because there is much discussion on the influences of cognitive development on language acquisition.

It seems to be clear that individuals without a bona fide symbol system (i.e., a social conventional form of language) are capable of thought. Just how far and deep thought can be developed (e.g., as in the concept of literate thought, discussed in Chapter 9) without a language and whether it is equivalent to that of individuals with a bona fide language is the subject of debate, especially with respect to some deaf children and adolescents (e.g., see Marschark, 1993, 2005, 2007; Moores, 2001; Paul & Jackson, 1993; Paul & Wang, 2006a; 2006b).

Language-Based Hypotheses

As mentioned previously, there are strong and weak versions of language-based hypotheses and variations of these views. The strongest version asserts that language determines thought—that is, linguistic determinism (Sapir, 1958; Whorf, 1956). Within this framework, there is a perfect, one-to-one correspondence between linguistic and cognitive aspects. However, in this case, the direction of the influence flows from language underpinnings to thought structures. Essentially, this means that all thoughts flow from the use of language. If there is no language, then there cannot be any real thought, according to this view. This position is exemplified by the linguist Sapir (1958), who remarked that:

> It is quite an illusion to imagine that one adjusts to reality without the use of language and that language is merely an incidental means of solving specific problems of communication or reflections . . . we see and hear and otherwise experience as we do because the language habits of our community predispose certain choices of interpretation (p. 162).

Although the evidence on the strong version is equivocal (e.g., see Bloom, 1981, for affirmative data, and Au, 1988, for contrary evidence; see also a readable account in Lund, 2003), it is not a widely accepted hypothesis. The focus now seems to be on weak variations or on language-specific hypotheses, which take into consideration the notion of innate structure and one of its major implications—constraints (e.g., the works of Chomsky and Fodor, mentioned previously in the section on language models or theories).

The weak version asserts that language influences thought. Although the case for the weak version is also equivocal, there does seem to be evidence

that language influences memory and perception (e.g., see Lund, 2003). It has been difficult to quantify or measure data that reflect this view. Within the cognitive perspective (discussed below), it has become somewhat clearer that language does indeed influence the processing of information. However, even this is controversial—in fact, it has been shown that children with severe disabilities are capable of a sophisticated level of language despite impairments in other areas of the cognitive domain, suggesting a relative independency of language and cognition (a lá Chomsky).

No doubt you are confused by the above discussion. I believe that it is safe to conclude that there is some influence of language on thought, but we have not worked out all the details. More interestingly, despite cognitive limitations, it is critical and possible to develop language in individuals with severe disabilities. These individuals can and should be taught language or some aspects of it so that they can communicate their needs and engage in some level of literate thought—at the very least. Pragmatically, it is important to develop both language and thought skills (e.g., making inferences), as indicated by the following discussion of thought-based hypotheses.

Thought-Based Hypotheses

The basic premise of thought-based hypotheses is that thought (cognition) influences or accounts for the development of language (Byrnes & Gelman, 1991; Cromer, 1988a, 1988b; Lund, 2003). That is, language grows out of cognition, or language is a mapping out of cognitive skills. Variations among the hypotheses are related to the interpretation of the strength of the influence of thought on language development.

The strong forms of thought-based hypotheses assert that language is not possible without cognitive underpinnings. This is a unidirectional model in which the direction of influence is from cognition to language. In these versions, the development of language is equal to but does not exceed cognitive development. This implies a one-to-one, or perfect, correlation between thought and language development.

The strong forms of thought-based hypotheses have been influenced pervasively by the work of Piaget (1980; see also Flavell, 1985; Phillips, 1981). Piaget asserted that language has only a modest, albeit important, role in the development of thought. The purported role of language has called into question the basic tenets of the strong views. Relative to research on cognition and deafness, some scholars (e.g., Kusche & Greenberg, 1991; see also Marschark, 1993; Moores, 2001; Paul, 2003) have argued that discrepancies

between individuals who are hearing and those who are deaf or hard of hearing on high-level, abstract cognitive tasks might be due predominantly to the effects of an inadequate development of *a* language in the individuals with hearing impairment.

The thinking of Cromer (1974, 1976, 1981) has influenced the weak versions of thought-based hypotheses. Weak versions assert that thought does not completely account for the development of language. It is acknowledged that some linguistic knowledge is dependent on language-specific skills. Language development is equal to or less than, but does not exceed, the development of thought. Evidence for the weak thought-based hypotheses has been reported in a number of investigations (see reviews in Cromer, 1988a, 1988b; see also a readable account in Lund, 2003).

Other variations of thought-based hypotheses can be found elsewhere (see discussion in Gelman & Byrnes, 1991). In my view, Harris (1992) proffered some compelling data against the strong thought-based hypotheses. This scholar argued that one possible implication of the strong view is that older second-language learners' acquisition of a language should be qualitatively different from that of first-language learners. For example, the older learners should know concepts (i.e., aspects of thought) that are not known by younger first-language learners. In fact, there is ample research showing that the language acquisition patterns of both first- and second-language learners (of English) are qualitatively similar, at least from a global, overall perspective. That is, both groups proceed through similar stages, make the same errors, and use congruent strategies in the acquisition of a language (e.g., McLaughlin, 1984, 1985; see also Paul, 2003, 2008; and Chapters 6, 7, and 8 of this text).

Table 3-6 presents a few major highlights based on this brief discussion of language and cognitive-based hypotheses.

Reflections and Implications for Deafness

My current reflections on this issue have led to the conclusion that high-level performance in one domain is dependent on a high-level development in the other domain. In addition, I agree with the argument that some knowledge is domain specific and does not always depend on a corresponding level of knowledge in the other domain (similar to Chomsky's view). For example, the understanding of a relative clause is predominantly a language-specific behavior that does not depend on cognitive prerequisites other than a basic level of developmental maturity.

Table 3-6 Major Principles of Language/Thought Hypotheses

General Principles
- The traditional basic premise is that one domain influences or accounts for the development of the other domain.
- Variations among the hypotheses are related to the interpretation of the strength of the influence of one domain on the other.

Language Hypotheses
Strong Versions
- Language determines thought, as in linguistic determinism.
- There is a perfect one-to-one correspondence between linguistic and cognitive aspects.
- The direction of influence is from language to thought.

Other Versions (Modularity)
- Most of these versions consider the notion of innate structure and one of its major aspects, constraints.
- Although language receives important input from cognitive and social forces, its main development is contained within or influenced by its own module or faculty and operates on maturation principles.

Thought Hypotheses
Strong Versions
- Language is not possible without cognitive underpinnings.
- The direction of influence is from thought to language.
- The development of language is equal to, but does not exceed, cognitive development.
- There is a one-to-one correlation between language and thought.

Weak Versions
- Thought does not completely account for the development of language.
- Language development is equal to or less than, but does not exceed, the development of thought.

Other Perspectives
- Thought and language share common underpinnings.
- Relationships between language and thought are influenced by social and cultural factors.
- There are many relations between thought and language, which vary across the individual's lifespan.

There seems to be growing evidence that the relationship between thought and language is bidirectional and interactive. In a few variations of this view, language plays an influential role, and in others cognition plays an influential role. It might be also that the so-called interactions between language and cognition can be explained by other factors, indicating that neither

language nor cognition is in the dominant, driver position. From another perspective, it could be argued that culture determines or influences both language and cognition (which leads to various views on the similarity of language and cognition). This view, influenced pervasively by social theories or the predominance of social and cultural influences, acknowledges the critical contributions of environmental or experiential factors to the development of both language and cognition. In essence, language and cognition grow as a part of the influences of the culture or environment. These influences can include emotions and interactions from the family and significant others as well as cultural values associated with families and groups.

Much of the research on deafness has been based on the models of Piaget, Vygotsky, and cognitive information processing, known as a stage-of-processing model. A more detailed discussion of these models as well as good reviews of the cognitive research on deafness can be found elsewhere (Greenberg & Kusche, 1989; Marschark, 1993; Paul & Jackson, 1993).

During much of the 19th century, most researchers on deafness seemed to have been influenced by a version of the language-dominates-thought hypothesis, ranging from the strong version to weak and interactive ones. For example, both Pintner (e.g., Pintner & Patterson, 1917; Pintner & Reamer, 1920) and Myklebust (e.g., 1964) argued that the intellectual deficits of many deaf individuals as determined by IQ tests (or some variation of these tests) were due primarily and predominantly to language deficiencies. Myklebust went further and argued that, because of the lack of a bona fide language, many deaf individuals perceived the world differently because they were compelled to rely on their other intact senses for interpreting information. Myklebust did not recognize a language of signs. In essence, the language-deficit hypothesis still has a few strong proponents today.

Moores (1987; see also Moores, 2001) categorized the influential works of Pintner and Myklebust as reflective of two major stages of research on intelligence and deafness labeled *Deaf as Inferior* and *Deaf as Concrete*, respectively. During the latter part of the 1900s, the cognition-dominates-language hypothesis and the cognition-and-language-are-independent hypothesis influenced the thinking of scholars on the intellectual development of deaf individuals. This resulted in the third and subsequent stages of research on intelligence and deafness, which Moores (1987) labeled *Deaf as Intellectually Normal*. **Table 3-7** provides the salient principles and findings of the stages of intelligence and deafness.

Until the publication of texts on the language status of American Sign Language (e.g., Klima & Bellugi, 1979; Liddell, 1980; Wilbur, 1987) and other

Table 3-7 Stages of Cognition and Deafness

Tenets of Stage 1: The Deaf as Inferior
- Most of the tests used with deaf individuals were developed for and normed on individuals with normal hearing ability.
- It was argued that deafness leads to intellectual deficiency.
- Most of deaf students' difficulty was attributed to the lack of an internalized, verbal symbol system, such as a language, and its associated representations of experiences.
- Findings were interpreted within a language-dominates-thought paradigm (strong version of language hypothesis).

Tenets of Stage 2: The Deaf as Concrete
- There were considered to be qualitative differences between deaf and hearing individuals relative to tasks that required abstract thinking.
- Mykebust's organismic shift hypothesis (1964) asserted that deprivation of the hearing sense leads to a different organization of experiences by the other senses.
- The proffering of unique, qualitative differences between deaf and hearing individuals led to the notion that there is a "psychology of deafness."
- Findings were interpreted within a language-dominates-thought paradigm.

Tenets of Stage 3: The Deaf as Intellectually Normal
- Deaf individuals are considered to be intellectually and cognitively similar to hearing individuals in all important abilities.
- Differences that still exist between deaf and hearing individuals are assumed to be due to linguistic, cultural, environmental, and task factors, rather than to the condition of deafness.
- Findings are interpreted within a thought-dominates-language paradigm (strong version of thought hypothesis).
- Most recent interpretations have been influenced by social theories of language development.

Adapted from Moores (1987), Paul & Jackson (1993), & Paul (2001).

sign languages, some scholars assumed that many deaf individuals (i.e., those with severe to profound impairment) did not have a command of a social-conventional language in any modality or form—for example, a spoken language such as English. Thus, it was assumed that studying these individuals would shed light on how cognition could grow in the absence of a well-developed bona fide linguistic system (see the imaginative lines of questioning presented at the beginning of this section). This line of thinking has been influenced by the cognition-dominates-language position or, more commonly, by the cognition-and-language-are-independent position, mentioned previously.

The work of Furth (1966) is illustrative. Furth attempted to determine whether language is critical for the development of Piagetian structures in

Table 3-8 Major Principles of Piaget's Stages of Cognition

Sensorimotor Stage
- This stage covers the period from birth to about 2 years of age.
- The child perceives and reacts to sensory data as related to basic needs and begins to organize and integrate these data into schemas.

Preoperational Stage
- This stage extends from about 2 to 7 years of age.
- There is an ability to think in a logical manner.
- Egocentrism prevents the child from separating the personal perspective from that of others, as manifested in the social interactions of the child.

Concrete Operational Stage
- This stage extends from 7 to about 11 years of age.
- The child is now able to distinguish personal self from others.
- The child can perform mental operations on objects that are physically present.

Formal Operational Stage
- This stage is the final stage and extends from about age 11 to about age 15 years.
- The stage is characterized by abstract thinking; there is little need for concrete objects and experiences.
- The individual can engage in metalinguistic and metacognitive activities; that is, she or he can think about language or about thinking.

Adapted from Flavell (1985) and Phillips (1981).

deaf individuals (see **Table 3-8** for a brief discussion of Piaget's stages). Piaget identified three time periods at which language might play an important—albeit modest—role in the development of thought. These three time periods are transitions from one stage to the next—for example, from sensorimotor to preoperation, from preoperation to concrete operation, and from concrete operation to formal operation (Byrnes & Gelman, 1991). Piaget also divided the development of children's language into two broad stages. The first stage includes egocentric speech, which emerges from non-communicative thought. This involves monologues and language play in which the child repeats simply for the pleasure of talking. The second stage involves socialized speech, which develops to include eventually all the forms required for social communication, such as information, criticism, commands, requests, questions, and so forth.

It should be underscored that Piaget only assigned a modest role for language in the development of thought. With respect to deaf individuals, Furth's

conclusions are similar to those of Piaget; that is, language does not play a major role in the development of cognitive structures. Nevertheless, Furth did maintain that language was important, specifically when it comes to addressing abstract concepts—concepts that need to be represented by linguistic symbols. Despite the role of language, Furth concluded that the cognitive level of deaf individuals is roughly commensurate with that of their hearing counterparts.

Others have viewed this situation from different perspectives. For example, most interpretations of the performances of deaf children and adolescents on Piagetian tasks are related to the nature and administration of the tasks. Some scholars (notably Rodda & Grove, 1987) remarked that the inferior performances of deaf children and adolescents are the result of social and psychological factors such as reduced stimulation, restricted educational access, and inadequate social and communicative interactions. This is an experiential hypothesis, which might also include language deprivation, but not always.

In my view, the effects of language on cognition cannot be overemphasized relative to the current thinking on the thought/language relationship and our understanding of literacy (Chapters 7 and 8) and literate thought (Chapter 9). The interactive effects of language and cognition might have influenced the performances of deaf children on many Piagetian tasks in the concrete and formal operational stages (see also the discussions of various perspectives in Greenberg & Kusche, 1989; Marschark, 1993; Paul & Jackson, 1993). The lack of language or a poorly developed language can affect the way information is organized, stored, and retrieved. It has even been speculated that this language deprivation prevents a transfer of function from the right hemisphere to the left hemisphere of the brain, which deals with processes that require a highly organized descriptive system or code, such as language (e.g., see a readable account in Sacks, 1989).

Relative to deaf individuals' performances on Piagetian tasks, the above view has also been stated by Greenberg and Kusche (1989), whose synthesis can be applied to any other cognitive tasks involving logic, reasoning, and other high-level skills (see also the discussion of literate thought in Chapter 9). Greenberg and Kusche (1989) acknowledged the role of visual-spatial ability for progress through the sensorimotor and much of the preoperational stages of Piaget. With respect to higher-level stages, these researchers asserted that:

> Although Furth . . . has interpreted the literature as evidence that language does not affect thinking, we believe that language has a strong effect on concrete and formal operational modes of thinking, while it has relatively less influence on sensorimotor and preoperational

thought. . . . With regard to abstract-proportional (or formal opera-
tional) thought, it may be that episodic memories, which are
encoded linguistically and/or symbolically (in speech or in signs) in
the hippocampal areas . . . perhaps through the use of verbal/sign
mediation, are more easily translated into propositional concepts or
schemes in the association area of the cortex . . . than are visually
encoded memories or images (p. 101).

There is still quite a bit of work to do on the complex relationship between
language and cognition, given the existence of contradictory and incomplete
evidence. As stated previously, my bias is that there is, eventually, especially in
adults, an interactive, reciprocal relationship between language and thought.
Language is critical for the development of higher aspects of thought (e.g., lit-
erate thought) and vice versa. For example, language influences the develop-
ment of critical thinking skills and cognitive strategies such as the ability to
make inferences, to synthesize information, and to proffer generalizations.

A language problem does not always reflect an underlying deficit in cog-
nitive development, and the opposite is also true. To put it another way,
there might be deficits in specific processes that are unique to either lan-
guage or cognition. Stating it yet another way, Cromer (1981, 1988a, 1988b,
1994) suggested that the presence of language difficulties is reflective of
problems in processes such as short-term memory, auditory processing, audi-
tory storage, and hierarchical planning. The interrelationships among these
variables are not completely understood, even in the voluminous research
that has been conducted on children and adolescents with language disor-
ders (see McGuinness, 2004, 2005).

In sum, there are theoretical and practical reasons for continuing the theo-
rizing, research, and debate on the nature of the relationships between lan-
guage and thought. With respect to deafness, there are numerous important
issues upon which to reflect and examine, several of which have been dis-
cussed in other sources (e.g., Marschark, 1993, 2005; Marschark et al., 1997;
Paul & Jackson, 1993). The few, selected issues highlighted here are not the
only ones that are important; however, these issues are examined further in the
ensuing chapters of this text. For example, the language/thought debate (as
well as related aspects of it) might offer insights into the development of con-
crete and abstract reasoning abilities; the effects, if any, of exposure to the var-
ious oral and manual communication systems (Chapters 4 and 5) upon the
development of language and thinking (including perceptual) skills; the effects
of acquiring a language later in life (say, early or late adolescence) versus

acquiring one during the typical time frame; the development of categorical knowledge and hierarchical organization (critical for literacy and literate thought, for example); and, of course, whether there are, indeed, quantitative or qualitative similarities or differences between deaf and hearing individuals with respect to either language or literacy development.

The most interesting and far-reaching revelations for teaching and learning situations in schools would be a better understanding of the language-cognition-experiential paradigm and its implications. Indeed, this would contribute to the already acrimonious debate on whether language can actually be taught or must be caught (i.e., via exposures and interactions). I suspect—similar to other complex and complicated concepts of life—that this is not an *either/or* phenomenon; rather, it is probably a *both/and* endeavor. This is true not only for the teaching of language but also for the relationship between language and thought.

SUMMARY OF MAJOR POINTS

Did this chapter answer the questions that you developed at the beginning or those that came to mind during your reading? Did you gain any insights into the tricky business of *theorizing language*? Of the relations between language and thought? Of the similarities and differences between the prelinguistic and linguistic periods? Were you able to relate your understanding to children who are deaf or hard of hearing? My hope is that you will read further on these complicated topics because I do feel that they contribute to the professional growth of teachers and clinicians.

This chapter presented basic information on theoretical frameworks of language acquisition, major highlights of the development of language, and salient aspects of the language/thought paradigm. Theorizing about language has been a difficult endeavor, and, at present, there does not seem to be a widely accepted view of the language acquisition process. This makes it difficult to proffer suggestions for the improvement of language in deaf and hard of hearing children and adolescents. A synopsis of the major ideas presented in this chapter is as follows.

With Respect to Theoretical Frameworks of Language

- There are essentially three broad groups of language models—environmental-behavioral, cognitive-linguistic, and social—with variations within each group.

- Environmentalists or behaviorists are interested in the associations or connections between environmental stimuli (empiricism) and the language behaviors of the child (performance).
- Cognitive-linguistic theories (notably cognitive-nativist theories) are theories of language competence within a mostly structuralist framework. For the most part, these theories attempt to address the internal structure of the human mind.
- Most social (or social-cognitive or cognitive-social) theories, particularly interactionist theories, incorporate tenets from both environmental/behavioristic and cognitive-linguistic approaches. This is considered to be a balanced perspective; however, the nature of the balance depends on the specific focus of models.
- There is a growing consensus that any adequate theory needs to consider a wide array of factors or conditions that interact within and outside individuals (e.g., biological, cognitive, environmental, social, neurophysiological, and so on).

With Respect to the Development of Language

Prelinguistic Development

- In the first months of life, infants begin to use their voices to control others and to get them to do things. Infants practice and perfect the habitual and significant sounds of the particular languages to which they are exposed.
- Prior to the emergence of intentional and meaningful communication, a child explores the environment for about one year. With this exploration comes the realization that persons, objects, and events are separate from the self.
- In essence, during the first year, the infant develops the precursors for the language components—phonology, syntax, semantics, and pragmatics. By the end of the first year, with the onset of object permanence and control over sounds for the first words, the child proceeds to the one-word stage.

Linguistic Development

- There appear to be wide variations in the early phonologic development of children. This development proceeds well beyond the first year and probably continues to be refined even in the early school years. Most of the phonologic rules are acquired by around 6 to 8 years of age.

- Vocabulary growth is rapid throughout the preschool and school years and highly variable among individual children. New words and meanings are not simply added in a serial fashion. Exposure to new words alters and refines the semantic representations of words and meanings and the relationships between words that are present in the child's vocabulary.
- Beyond the three-word stage, children's syntactic development consists of using the major transformations of the language (question formation, relativization, and passive voice).
- In general, most children internalize much of the grammar of the language by the age of 4 or 5 years and master nearly all of the grammar by age 9 or 10.

With Respect to the Relation Between Language and Thought

- Traditionally, there have been discussions of cognition-dominates-language models or language-dominates-cognition models, with strong or weak variations.
- One emerging view is that there might be several or many relations between language and thought. Some of these relations might be relevant to specific domains or categories of language or to specific domains or categories of cognition. It needs to be kept in mind that relations between language and cognition vary across the course of an individual's development.
- With respect to deafness, the language/thought debates might eventually offer insights into, for example, the development of concrete and abstract reasoning abilities; the effects, if any, of exposure to the various oral and manual communication systems upon the development of conceptual and perceptual skills; the effects of acquiring a language later in life; the development of categorical knowledge and hierarchical organization (e.g., critical literacy); and whether there are quantitative or qualitative similarities or differences between deaf and hearing individuals.

The first three chapters, particularly the last two chapters, should have provided a fairly solid foundation for understanding language acquisition and development. Now you are ready to explore these issues further with respect to deaf and hard of hearing children and adolescents. We begin, in the next chapter, with the discussion of the development of oral English variables—that is, speech, speech reading, and the use of residual (i.e., remaining) hearing. Then we move on to the sign systems based on English

(Chapter 5), and finally to American Sign Language (Chapter 6). These three chapters are often placed under the rubric of language/communication approaches, which is one of the most controversial, contentious areas in the field of deafness.

FURTHER READINGS

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