ALICE OMAGGIO HADLEY

TEACHING LANGUAGE *in* CONTEXT

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Teaching Language *in* Context

Alice Omaggio Hadley
University of Illinois at Urbana-Champaign

With technological updates by
Robert M. Terry

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2 On Learning a Language: Some Theoretical Perspectives

Introduction

In Chapter 1, various ways to define and describe language competence were explored, and components of language that were thought to be important in designing models of "communicative competence" and "language proficiency" were identified and considered. We saw that many of the same components (grammatical, lexical, phonological, pragmatic, sociolinguistic, and discourse features) were included in the various models that have been proposed. Although we have not reached complete consensus on the question of what it means to know a language, the profession is in basic agreement about the features of language that are relevant to that question.

This chapter addresses another fundamental question that concerns language researchers and practitioners: How do adults become proficient in a second language? Consensus about this question may be far more difficult to achieve. Ellis (1985) comments that there has been a great deal of theorizing about second-language acquisition (SLA), especially since the early 1970s, and that "the research literature abounds in approaches, theories, models, laws, and principles" (p. 248). He speculates that perhaps the profession has generated far too many theories, agreeing with Schouten (1979) that "too many models have been built and taken for granted too soon, and this has stifled relevant research" (p. 4, cited in Ellis 1985, p. 248). Spolsky (1989) argues for the development of a unified macro-theory—a new general theory of second-language learning—and outlines seventy-four separate "conditions" that would need to be integrated into such a comprehensive model. McLaughlin (1987) takes the view that although micro-theories, which try to deal with a smaller range of phenomena and are limited in scope, may be "intrinsically more satisfactory" (p. 9), a theory must be comprehensive enough to explain more than a very limited range of phenomena: "A sat-

isfactory theory of adult second-language learning must go beyond accounting for how people form relative clauses" (pp. 9–10). He adds that, given the relatively early stage of the development of knowledge in the field of second-language acquisition, "it seems premature to argue for the 'truth' of one theory over another" (p. 6). Larsen-Freeman and Long (1991) agree, suggesting that it would be counterproductive for SLA researchers to espouse one single dominant theory of language acquisition, particularly as this might discourage competing points of view:

> *We must guard against overzealousness on the part of theorists or their devotees who feel that they have a monopoly on the truth. While SLA research and language teaching will benefit from the advantages of theoretically motivated research . . . , it would be dangerous at this stage for one theory to become omnipotent (p. 290).*

Practitioners who have been buffeted across the years by pressures to adopt different approaches to teaching, due to the changing winds of theory, may tend to agree with this resistance to theoretical "bandwagons" (Grittner 1990).

Why do language teachers need to know about theory, especially if it seems unlikely that we can reach agreement about how language learning and acquisition take place? One reason might be that most language teaching methodologies have grown out of a particular theoretical framework of second-language acquisition, and it would be helpful for teachers to understand some of the premises underlying those approaches in order to evaluate them. A second reason for understanding a range of theoretical viewpoints is that it may help teachers develop and/or clarify their own set of principles for language teaching. Ellis (1985) maintains that every teacher already has a theory of language learning, but that many teachers may have never articulated what that theory is. The fact, however, that we choose to do certain activities in the classroom and decide not to do others shows that we are working on some underlying assumptions about what is useful in promoting the development of language proficiency. Therefore, before examining some of the theories that have been influential in the field of language teaching over the years, it might be constructive to make a preliminary assessment of some of the assumptions that may underlie our own beliefs about language learning.

Illustration 2.1 presents a set of questions that can serve as a guide for discussion or as an instrument for self-assessment to help teachers clarify and articulate their current beliefs about the way adults develop competence in a second language. The reader may want to consider these questions before going on to the next section.

Exploring Theories of Language Learning

Recent reviews of language acquisition theory (McLaughlin 1978, 1984, 1987; Ellis 1985, 1990; Brown 1987, 1994; Larsen-Freeman 1991) have attempted to group various theoretical perspectives along a kind of continuum, ranging from *empiricist* views on one end to *rationalist* or *mentalist* positions on the other, with theories that blend these two perspectives placed somewhere in between. This opposition

Illustration 2.1
Discussion Guide: Beliefs about Second-Language Learning

This set of questions is designed to help teachers explore their assumptions and beliefs about second-language learning and teaching. The questions relate to some of the issues that underlie various theories of language acquisition in this chapter.

1. Do adults learn foreign languages in a manner similar to the way children acquire their native language, or are the processes involved in child and adult language learning different?
2. Are humans born with a special capacity for language that is specific to our species? Or is language learning like other kinds of learning, governed by general cognitive processes not specific to language? If we are born with a specialized capacity for acquiring a native language as children, does it work the same way with adults who are learning a foreign or second language?
3. How does our knowledge of our native language affect our learning of a new language? Does some of the knowledge we have transfer to the new language? If so, is this helpful, or can it be a hindrance?
4. What is the optimum type of "input" for adults who are beginning their study of a foreign language? Do they profit best from listening to native speakers for some initial period of time before being asked to speak? Should the input they receive be ordered or sequenced carefully to correspond to what they already know? Or is it sufficient that the input be relatively comprehensible, even if some structures have not yet been studied?
5. What role does interaction with native speakers, teachers, or other learners have in language acquisition? What kinds of information about the target language can we obtain through such interaction? What kinds of information can we obtain about our own developing language proficiency when we interact with others?
6. What is the role of explicit grammar instruction in adult foreign language learning? Can adults become proficient in a second language without having conscious knowledge of the rules of that language? Or do adults profit in some way from grammar explanations and examples of how specific features are used?
7. Do language learners acquire grammatical features in a predictable order when language learning occurs in natural-use situations? Does instruction in formal classrooms need to follow a "natural order" to be effective?
8. What is the role of practice in adult language learning? Is language learning like the learning of other "skills," such as learning to play a musical instrument, where a great deal of focused practice is necessary to become proficient? Or is language learning fundamentally different from other forms of human learning?
9. Do students need to have an opportunity to practice new forms and structures in "controlled" activities before being asked to communicate their own meaning using those features? Or should students be encouraged to engage in conversation activities where communication is the main focus from the beginning of language instruction? When learners are engaged in meaningful and creative communication, do they tend to make more errors than when they are doing controlled or form-focused activities?
10. What is the role of feedback in language learning? How important is it to give learners information about whether they are making errors as they use the new language? Is it better to correct most or all of the errors students make, or should error correction be minimal in the language classroom? What are optimal ways to provide feedback to adult foreign language learners?

of viewpoints is not new; Chomsky had made the rationalist/empiricist distinction in discussing linguistic theory in 1965, and Diller (1978) spoke of the existence of a longstanding "language teaching controversy" between the *rationalists* and the *empiricists* "whose roots can be traced to the beginnings of modern thought" (p. vii). The basic difference between the two positions seems to lie in the presumed locus of control of the process of language acquisition. The rationalist position includes theories that assume that humans have an innate capacity for the development of language, and that we are genetically programmed to develop our linguistic systems in certain ways (Chomsky 1965). Larsen-Freeman (1991) refers to this point of view as a "nativist" or "innateness" position, which is in strong opposition to the "behaviorist" or "environmentalist" perspective. This latter position is characteristic of the empiricists, who maintain that it is the learner's experience that is largely responsible for language learning and is more important than any specific innate capacity (Larsen-Freeman 1991, p. 323). McLaughlin (1978, 1984) characterizes the empiricist viewpoint as one that is skeptical of any explanation of language learning that cannot be observed. Learning is seen as the result of external forces acting on the organism rather than the programmed unfolding of language through internal biological mechanisms. Empiricists, therefore, assume that there is no special species-specific language ability, but that language learning is just one aspect of general learning ability or capacity.

The next section provides a sampling of theories representing these different categories or classifications, chosen to reflect some of those perspectives that have had the most influence or potential influence on classroom practice. Because there is such a profusion of competing theoretical viewpoints in the professional literature, this discussion will not be comprehensive. The interested reader would do well to consult additional sources such as Ellis (1985, 1990), Brown (1987, 1994), McLaughlin (1987), Spolsky (1989), Larsen-Freeman and Long (1991), Gass and Selinker (1994), Towell and Hawkins (1994), Cook (1996), and Mitchell and Myles (1998) for more detailed treatments of a wide spectrum of theoretical viewpoints.

From Empiricism To Rationalism: A Theoretical Sampler

The various theories of language learning to be discussed in this section have been placed along the continuum in Illustration 2.2, which depicts in graphic form the range of viewpoints referred to in the preceding pages. The placement on the continuum is not meant to be exact or precise, but rather locates theories in a general way in terms of their compatibility with empiricist or rationalist points of view. The characteristics and underlying assumptions of each of these theories will be briefly summarized below. For a more thorough treatment of a particular theory, consult the primary sources in the references.

An Empiricist Perspective: Behaviorism

Since ancient times philosophers have believed that human learning and animal learning might be similar (Chastain 1976). Chastain points out that it was the publication of Darwin's *Origin of the Species* in 1859 that made this belief more

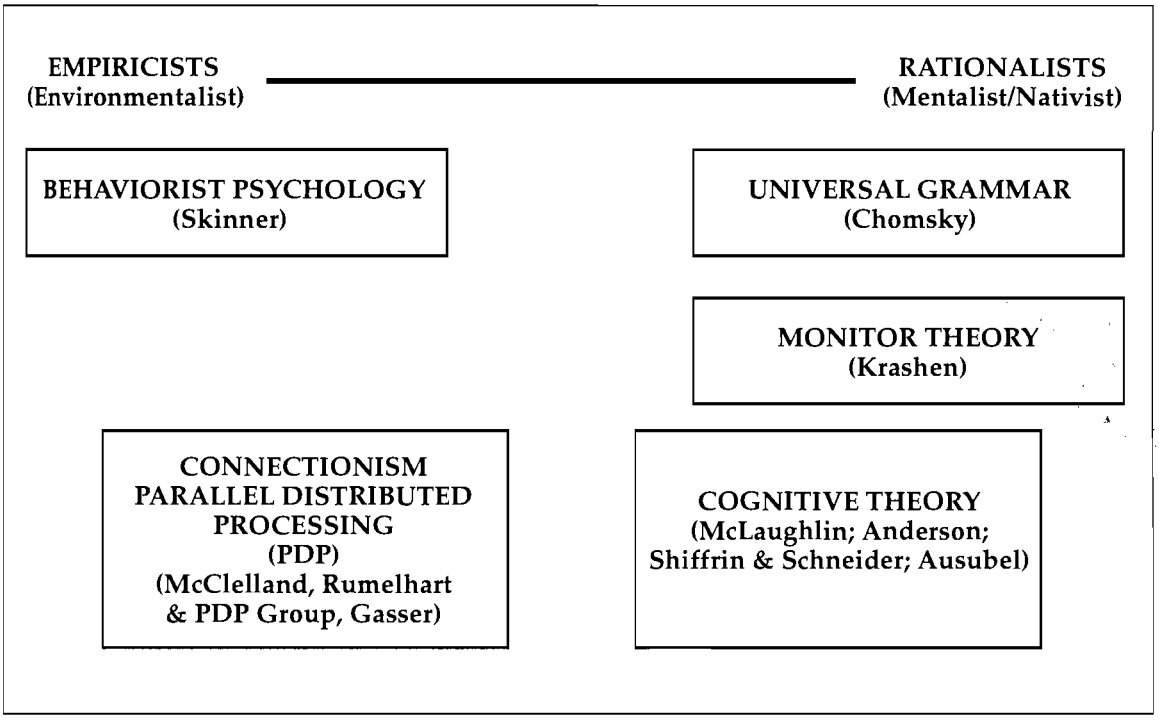

Illustration 2.2 The Rationalist-Empiricist Continuum

credible, since Darwin's theory implied that there was indeed a continuity between the human species and the lower animals, and by implication between the human mind and the animal mind. In the late nineteenth and early twentieth centuries, a growing interest in animal behavior led to the growth of experimental psychology and the school of behaviorism.

According to S-R (stimulus-response) psychology, all behavior is viewed as a response to stimuli, whether the behavior is overt (explicit) or covert (implicit). According to the theory, behavior happens in associative chains; all learning is thus characterized as associative learning, or habit formation, brought about by the repeated association of a stimulus with a response (Hilgard 1962). This process of habit formation, or *conditioning,* was thought to be of three basic types: (1) classical conditioning, (2) operant conditioning, and (3) multiple response learning (pp. 253–274).

In *classical conditioning* (best known through experiments done by Pavlov), an association between a conditioned stimulus and a response was repeatedly strengthened through the presentation of that stimulus with another, unconditioned one. In Pavlov's experiments with dogs, the unconditioned stimulus was meat powder and the response was salivation. When Pavlov repeatedly presented the meat powder with the simultaneous ringing of a bell, the dog learned to sali-

vate to the sound of the bell (the conditioned stimulus), even in the absence of the meat.

In *operant conditioning* (also known as *instrumental conditioning*), the response to a stimulus is learned although it is not normally a natural response to that stimulus. A rat pressing a bar in its cage may at first do so randomly. But if the rat discovers that pressing the bar releases a food pellet, it learns to push the bar again for the same reward. The *operant* (the random bar-pushing behavior) becomes conditioned (purposeful behavior) because it produces an effect that is rewarding.

In *multiple-response learning*, the animal learns a whole chain of behaviors and performs them in succession, always in the same order. A rat that runs a maze learns a fixed series of turns through conditioning, rewarded by a food pellet or two for his trouble.

What has all of this to do with language learning? As Chastain (1976) points out, behaviorism took a strong foothold in the thinking of psychologists by the middle of the twentieth century, influencing, in turn, the views of the education community:

> *Soon behaviorists concluded that all learning consisted of some form of conditioning. The organism was conditioned to respond in a specific way to a selected stimulus. Complex activities were nothing more than a complex collection of conditioned responses. Since all learning is conditioned and since human learning is similar to learning in animals, the next step was to conclude that human learning could be, and is, conditioned in the same way. The belief was that humans are reinforced by their environment in much the same way as the rat in a maze (p. 105).*

B. F. Skinner (1957), perhaps the best known proponent of S-R psychology, used the term *operant conditioning* to describe verbal learning. In his view, language is characterized as a "sophisticated response system" that humans acquire through automatic conditioning processes (Wardhaugh 1976, p. 142). Some patterns of language are reinforced (rewarded) and others are not. Only those patterns reinforced by the community of language users will persist. In Skinnerian psychology, the human being is likened to a machine with multiple working parts. The mind is thought to be "a *tabula rasa* upon which are stamped associations" between various stimuli in the environment and responses chosen from outside the organism for reinforcement (Chastain 1976, p. 133).

Skinner's theory of verbal learning was consistent with the prevailing beliefs of many applied linguists of the 1940s and 1950s who maintained that second languages should be learned through extensive drill and practice without recourse to rationalistic explanation. In his *Outline Guide for the Practical Study of Foreign Languages* (1942), Bloomfield had argued for an essentially behavioristic approach:

> *The command of a language is not a matter of knowledge: the speakers are quite unable to describe the habits which make up their language. The command of a language is a matter of practice. . . . Language learning is overlearning: anything else is of no use (Bloomfield 1942, p. 12, cited in Chastain 1976, pp. 107–08).*

Illustration 2.3
Summary: Behaviorist Theory (Based on Skinner 1957; Hilgard 1962; Chastain 1976; Wardhaugh 1976)

Summary: Behaviorist Theory

1. Human learning and animal learning are similar.
2. The child's mind is a *tabula rasa*. There is no innate pre-programming specifically for language learning at birth.
3. Psychological data should be limited to that which is observable.
4. All behavior is viewed as a response to stimuli. Behavior happens in associative chains; in fact, all learning is associative in nature.
5. Conditioning involves the strengthening of associations between a stimulus and a response through reinforcement.
6. Human language is a "sophisticated response system" acquired through operant conditioning.

Illustration 2.3 summarizes the main points of the behaviorist view of language learning. Behaviorist theory, in conjunction with the structuralist views of language that prevailed in the 1940s and 1950s, laid the theoretical foundations for audiolingual language teaching methodology, discussed in more detail in Chapter 3.

CRITIQUE:

We have seen that behavioristic theories of language learning were based on the assumption that language learning was like any other kind of learning, and, therefore, one could extrapolate heavily from general learning theory and even from animal learning. This viewpoint was seriously challenged by Chomsky (1959) in a very critical review of Skinner's work. Chomsky maintained that language behavior was far more complex than the establishment of S-R connections, and that Skinner's theory could not possibly explain the creativity of children in generating language.

According to McLaughlin (1978, 1984), Skinner's 1957 treatise, *Verbal Behavior,* was not supported by research with human subjects. There was, in fact, no substantial research base ever generated by behaviorists to look at child language use, let alone second-language learning. He adds that evidence gleaned from subsequent studies of child language behavior shows that a simple behavioristic perspective does not provide a satisfactory explanation of what has been found: It seems that imitation and reinforcement have a much smaller role to play in child language than Skinner and his colleagues imagined. For example, children often produce forms that they never heard their parents or other adults say ("I goed" or "two foots"). Thus, imitation of adult speech cannot completely account for the way children produce language: "The child's language is simply too strange" (McLaughlin 1984, p. 15). Furthermore, parents rarely correct their children's grammatical errors but respond instead to the message content (Brown and Hanlon 1970; Brown 1973). If ungrammatical forms are thus positively rewarded (or at least ignored), how then do children eventually eliminate them? A behaviorist view of language, which would predict the need for both imitation and negative feedback in the form of overt corrections, does not seem to explain the way in which children learn.

With Chomsky's review of Skinner's theory there came a paradigm shift toward

the other end of the theoretical continuum. If language development was highl creative, then language learning theories needed to account for the creative pro cessing that was taking place in the human mind. By the mid-1960s, the pendu lum was swinging in the direction of the rationalist point of view.

Three Rationalist Perspectives of Language Learning

1. Universal Grammar

Various reviews of theories of language learning (Chastain 1976; Wardhaugh 1976; McLaughlin 1978, 1984, 1987; Ellis 1985, 1990; Brown 1987, 1994; Larsen-Freeman 1991) group a variety of perspectives within the "rationalist" camp. Other terms used in association with this perspective are "nativist," "mentalist," and "cognitive." A highly influential nativist viewpoint grew out of Chomsky's work, starting with the publication in 1957 of his book *Syntactic Structures*, and his critique of Skinner in 1959. As we saw earlier, Chomsky had rejected the behaviorist perspective and adopted instead a mentalist viewpoint that was closely related to the basic principles and beliefs of cognitive psychology (Chastain 1976). Other theorists, such as Eric Lennenberg (1967) and David McNeill (1966) believed that language was a species-specific, genetically determined capacity and that language learning was therefore governed by biological mechanisms. In 1965, Chomsky had concluded that children were born with some kind of special language processing ability and had proposed the existence of a "language acquisition device" (LAD). A year later, McNeill (1966) characterized this LAD as having various innate linguistic properties. Brown (1994) summarized them to include (1) the ability to distinguish speech sounds from other sounds; (2) the ability to organize language into a system of structures; (3) the knowledge of what was possible and what was not possible in any linguistic system; and (4) the ability to construct the simplest possible system based on the linguistic data to which one was exposed.

innate ability

Chomsky argued further that it must be the case that children were innately programmed to acquire language since they do it so quickly (in just a few years and with such limited (and less than ideal) input. He also believed that they could not help but construct a certain kind of linguistic system—a particular transformational or generative grammar—any more than they could help the way their visual system perceived solid objects or lines and angles (Chomsky 1965). Although a child's experience with language input could have an effect on language learning, the "ultimate form will be a function of those language universals that exist in the human mind" (McLaughlin 1984, p. 16).

Universal Grammar theory posits the existence of a set of basic grammatical elements or "fixed abstract principles" that are common to all natural human languages and that predispose children to organize the input in certain ways. The principles themselves are thought to be innate, a product of the "LAD." They include *substantive* universals, which consist of fixed features of languages like phonemes or syntactic categories like nouns and verbs, as well as *formal* universals, which are more abstract, and which place limits or constraints on the possible rule systems or on the options children have for constructing a grammar (Chomsky 1965, pp. 27–30; Ellis 1985, pp. 192–93).

Illustration 2.4
Summary: Universal Grammar Theory (Based on Chomsky 1965; Ellis 1985; McLaughlin 1987; Larsen-Freeman 1991)

Summary: Universal Grammar Theory

1. Language is a species-specific, genetically determined capacity.
2. Language learning is governed by biological mechanisms.
3. The ultimate form of any human language is a function of language universals, a set of fixed abstract principles that are innate.
4. Each language has its own "parameters" whose "settings" are learned on the basis of linguistic data.
5. There is a "core grammar," congruent with universal principles, and a "peripheral grammar," consisting of features that are not part of universal grammar.
6. Core grammar rules are thought to be relatively easier to acquire, in general, than peripheral rules.

Ellis (1985) provides the following example of a formal universal: One might formulate certain principles that place limits on how languages can use word order transformations in order to form questions. All languages must operate within those limited options, yet each language has its own particular "parameter settings" for question formation. The child's task is to discover which of the various options applies in his or her language. This is where environmental input is crucial: The child needs to hear the language spoken in order to select the appropriate options and thus set the parameters correctly.

According to Chomsky, the universal principles that children discover constitute their "core grammar," which is congruent with general principles operating across all languages. The "peripheral grammar" consists of rules or features that are not determined by universal grammar, but that might be derived from an older form of the language, borrowed from another language, or that might have arisen accidentally (Cook 1985, cited in Ellis 1985). Rules of the core grammar might be easier to acquire than the rules of the peripheral grammar, since the latter "are thought to be outside of the child's preprogrammed instructions" (McLaughlin 1987, p. 96). Wesche (1994) suggests that language learners probably acquire peripheral rules through the use of "general cognitive abilities" (p. 239).

Chomsky's Universal Grammar theory and associated derivative approaches to the study of linguistic universals are quite complex. Most discussions of the research in this area require some specialized knowledge of theoretical linguistics in order to fully understand the findings. (However, see Pinker [1994] for a very readable discussion of some of the important aspects of this theoretical approach to language acquisition.) As was mentioned earlier, the discussion of theories in this chapter is meant to be introductory in nature; readers interested in a more detailed treatment should consult the sources cited in this section. For a summary of some of the main premises of Universal Grammar theory that have been presented here, see Illustration 2.4.

CRITIQUE:

Although Chomsky's generative grammar theory has had a wide-ranging influence on the field of linguistics and on theories of how children acquire a native language, Universal Grammar theory has not won universal acclaim. Beedham

(1995) reviews the work of a number of scholars who have been critical of generative models (such as Gross 1979; Hall 1987; Moore and Carling 1982, among others) and criticizes the basic methodology of the generative approach to language acquisition. He maintains that all models of "generative grammar" have at least two basic flaws: (1) confusion of "mathematical notation" with linguistic form and (2) circularity of argumentation:

> *The principles and criteria of Principles and Parameters theory are merely assumptions, with nothing to back them up except the circular argument that without them language would be unexplained . . . (Beedham 1995, p. 209).*

Beedham also strongly criticizes generative grammar theory because of what he claims to be its "complete lack of applicability." Although he recognizes that theoretical subjects are different from applied subjects, he maintains that at some point, a theory needs to be empirically tested in some type of application:

> *This is yet to happen to generative grammar. Certainly it is now universally recognized that generative grammar cannot be applied to language teaching (p. 214).*

However, the question of how Universal Grammar might play a role in adult language learning is still a subject of much debate in the field of second-language acquisition. McLaughlin (1987) states that "Universal Grammar theory does not concern itself with second-language acquisition" (p. 91), but that a number of second-language researchers have applied principles of Universal Grammar to this domain in an effort to find sufficiently sophisticated explanations of the very complex characteristics of interlanguages. Wesche (1994) maintains that although Universal Grammar theory is widely accepted in first language acquisition, second-language acquisition specialists disagree about whether Universal Grammar continues to operate in adult learners or play any significant role. She adds that even if it does play a role in second-language acquisition, it is limited to the core grammar and does not help explain how learners acquire such important features of language as the elements of peripheral grammar, vocabulary, discourse competence, or other performance features. It also does not help explain "the dramatic individual differences found in the rate and ultimate mastery of the second language" (p. 239).

Some theorists operate on the assumption that the same universals that children use to construct their native language are available to adults; others believe that they are no longer available, and that different cognitive processes must be involved in adult second/foreign language learning (see Larsen-Freeman 1991). Gass and Selinker (1994), for example, discuss the "Fundamental Difference Hypothesis," proposed by scholars such as Schachter (1988) and Bley-Vroman (1989), who argue that adults no longer have direct access to UG principles. Instead, they maintain that child language acquisition, especially of a first language, and adult language acquisition of a second language are quite different in several important ways. First, adults rarely achieve native levels of proficiency or full competence in a second language, whereas children normally do achieve this

their native language. Children can learn any of the world's languages equally well; adults experience differing levels of difficulty, depending on how closely the foreign language is related to their native language. (We saw this, for example, in the difficulty hierarchies outlined by the Foreign Service Institute in Chapter 1.) Gass and Selinker further point out that adults and children have differing levels of knowledge about how languages work, given that adults already have full competence in their native language when they begin to learn a foreign language. One additional difference is the role that motivation and attitude toward the target language can play in adult language acquisition. Differences in motivation do not seem to have any appreciable impact on the child's learning his or her native language; however, motivation and attitude are important factors for adults learning a foreign language (pp. 124–25).

Nevertheless, many scholars in the field of second-language acquisition still feel that Universal Grammar can play a role, and Gass and Selinker (1994) maintain that much of second-language acquisition research "is driven by the notion that first and second language acquisition involve the same processes" (p. 124). The rationalist theories that are discussed in the next two sections represent two different perspectives on how first- and second-language acquisition are related.

2. Krashen's Monitor Theory: First- and Second-Language Acquisition Are Similar

One of the most influential and widely discussed models of language learning/acquisition in recent years is Stephen Krashen's "Monitor Model." The most complete description of the theory (1982) describes five central hypotheses:

1. *The acquisition-learning distinction,* which "states that adults have two distinct and independent ways of developing competence in a second language": *acquisition,* which is a subconscious process "similar, if not identical, to the way children develop ability in their first language"; and *learning,* which refers to conscious knowledge of the rules of grammar of a second language and their application in production (p. 10).
2. *The natural order hypothesis,* which maintains that acquisition of grammatical structures (primarily morphemes) follows a predictable order when that acquisition is natural (i.e., not via formal learning).
3. *The monitor hypothesis,* which states that acquisition is the sole initiator of all second-language utterances and is responsible for fluency, while learning (conscious knowledge of rules) can function only as an "editor" or "monitor" for the output. This monitor operates only when there is sufficient time, the focus is on form, and the language user knows the rule being applied.
4. *The input hypothesis,* which maintains that we acquire more language only when we are exposed to "comprehensible input"—language that contains structures that are "a little beyond" our current level of competence ($i + 1$), but which is comprehensible through our use of context, our knowledge of the world, and other extralinguistic cues directed to us. According to this hypothesis, acquirers "go for meaning" first, and, as a result, acquire structure as well. A third part of this hypothesis states that input need not be deliberately planned to contain appropriate structures ($i + 1$): If

communication is successful and there is enough of it, $i + 1$ is provided automatically. A final part of the input hypothesis maintains that speaking fluency cannot be taught directly, but rather "emerges" naturally over time. Krashen maintains that although early speech is not grammatically accurate, accuracy will develop over time as the acquirer hears and understands more input.

5. *The affective filter hypothesis* states that comprehensible input can have its effect on acquisition only when affective conditions are optimal: (1) the acquirer is motivated; (2) he has self-confidence and a good self-image; and (3) his level of anxiety is low. When learners are "put on the defensive" (see Stevick 1976), the affective filter is high, and comprehensible input can not "get in." (For a fuller account of these five hypotheses, see Krashen 1982, pp. 9–32.)

Krashen suggests that there are certain implications for classroom practice if language instruction is to be consistent with his theory. Among these are:

1. The main function of the classroom may be to provide comprehensible input in an environment conducive to a low affective filter (i.e., high motivation, low anxiety).
2. The classroom is most useful for beginners, who cannot easily utilize the informal environment for input. That is, it is useful for foreign language students who do not have input sources outside of class or for those whose competence is so low that they are unable to understand the language of the outside world (pp. 33–37).
3. The requirements for optimal input are that it be (a) comprehensible, (b) interesting and relevant, (c) *not* grammatically sequenced, (d) provided in sufficient quantity to supply $i + 1$, and (e) delivered in an environment where students are "off the defensive" (p. 127).
4. Error correction should be minimal in the classroom; it is of *some* limited use when the goal is learning, but of *no* use when the goal is acquisition. Error correction raises the affective filter and should, therefore, not be used in free conversation or when acquisition is likely to take place (pp. 116–117).
5. Students should never be required to produce speech in the second language unless they are ready to do so. Speaking fluency cannot be taught, but "emerges" naturally in time with enough comprehensible input.

Illustration 2.5 summarizes the main premises of Monitor Theory. A more completely developed model of language teaching using Krashen's theory as a basis is given by Terrell (1977, 1982). His "Natural Approach" is discussed in detail in Chapter 3.

CRITIQUE:

A number of the hypotheses and assertions in Krashen's theory of second-language acquisition have been challenged in recent years. In an early review of the Monitor Model, Munsell and Carr (1981) questioned the distinction between

Illustration 2.5
Summary of Monitor Theory (Based on Krashen 1982)

Summary: Monitor Theory

1. Adults have two distinct ways to develop competence in a second language: *acquisition*, which is a subconscious process, and *learning*, which is conscious.
2. *Acquisition* is similar to the process by which children acquire their native language. *Learning* involves conscious knowledge of rules.
3. When *acquisition* is natural, the order in which certain grammatical features of the language are acquired is predictable.
4. *Learning* can function only as an "editor" of what is produced, since *acquisition* is the sole initiator of all second-language utterances. Learning can serve as a "monitor" of performance only under certain conditions.
5. We acquire new structures only when we are exposed to "comprehensible input" ($i + 1$). Input does not need to be deliberately structured or planned for the acquirer. If communication is successful, $i + 1$ will happen automatically.
6. For acquisition to take place, the learner must be motivated, have a good self-image, and be free from anxiety.
7. Error correction should be minimized in the classroom, where the main purpose of instruction should be to provide comprehensible input.

"learning" and "acquisition" and the notion of "conscious" and "unconscious" rules. The reviewers also seem to object to the underlying nativist assumptions of the model and the implications that language learning is distinct from other kinds of learning. In their view, language skill is much like other kinds of skilled performance:

> *Krashen may not wish to extend Monitor Theory to chess, yet the measured characteristics of the knowledge of skilled chess players bear some striking similarities to the characteristics of linguistic knowledge. . . . Similarly, such disparate areas of skill as sports and mathematics seem to benefit from early emphasis on conscious and systematic learning despite the fact that expert performances in these areas also display a number of characteristics that formally resemble expert performance in language. We cannot imagine trying to learn basketball, monopoly, bridge, or quantum mechanics simply by watching people do them, trying them, and creatively constructing the rules. It is much easier to start with some conscious exposition of the rules and build one's skill upon that foundation (pp. 498–99).*

Munsell and Carr imply that Krashen should incorporate language learning theory into a wider context where the nature of human skilled performance in general is explored. This point of view is congruent with the commentary on Monitor Theory made by McLaughlin (1987) who leans toward a more *cognitive* perspective.

McLaughlin's objections to Monitor Theory are summarized in the following five points:

1. "The acquisition-learning distinction is not clearly defined." Therefore, the central claim that Krashen makes that "learning" cannot become "acquisition" cannot be tested (p. 56).
2. Various studies have shown that the Monitor does not work the way Krashen originally thought it would, and he has had to place more and more restrictions on the conditions under which it would be used effectively. McLaughlin believes that these restrictions make Krashen's conceptualization of "learning" of limited usefulness in explaining a learner's conscious knowledge of grammar.
3. The case for the Natural Order Hypothesis is quite weak due to methodological problems. "If the Natural Order Hypothesis is to be accepted, it must be in a weak form, which postulates that some things are learned before others, but not always" (p. 56).
4. Since no clear definition of "comprehensible input" is given, McLaughlin believes the Input Hypothesis is also untestable.
5. The Affective Filter Hypothesis is also questionable, not only because Krashen has not explained how this filter develops, but also because it does not take individual differences among learners into account. McLaughlin states that this hypothesis is incapable of predicting the course of linguistic development with any precision.

Although Krashen's theory has been criticized on a variety of points by a number of scholars, it has also had a strong influence on thinking in the field over the past twenty years. Virtually everyone who talks about language learning in recent years seems compelled to consider whether it is "learning" or "acquisition" that is the focus of attention in one's remarks. Many people feel that the distinction has at least an intuitive appeal and that it represents some psychological reality. In the same way, many practitioners recognize the need to provide learners with "comprehensible input" and find Krashen's recommendation that affective considerations be primary in the classroom very appealing. In many ways, Krashen has articulated in his Monitor Theory hypotheses about language learning that have touched a responsive chord for many practitioners. This is not to say, however, that the criticisms reviewed above should not be considered seriously as one evaluates the merits of Monitor Theory.

As mentioned earlier, some theorists prefer a view of language learning that recognizes essential differences between the way children and adults process information. Although there may be some similarities between child and adult language learning, Cognitive theory predicts that adult second-language learning will differ in some important ways from the way in which children acquire their native tongue.

3. Cognitive Theory: First- and Second-Language Learning Differ

Larsen-Freeman and Long (1991) categorize various cognitive approaches to language acquisition as "interactionist" views, where both external and internal factors are considered in accounting for language acquisition (p. 266). Although this characterization may be valid, the emphasis on environmental factors seems

rather limited when compared to the role assigned to internal or mental processes in descriptions of Cognitive theory given by Ausubel (1968), Ausubel, Novak, and Hanesian (1978), Ellis (1985, 1990), and McLaughlin (1987, 1990). For this reason, the theory has been placed toward the rationalist end of the continuum in Illustration 2.2.

We have seen that Universal Grammar theory considers the role of innate linguistic universals in language acquisition and claims that there is a specific *linguistic* capacity that is unique to the human species. Cognitive theory, by contrast, derives from the field of cognitive psychology and focuses on the role of more *general* cognitive processes involved in language acquisition, such as transfer, simplification, generalization, and restructuring (McLaughlin 1987). Like Universal Grammar, Cognitive theory is in direct opposition to Behaviorist theory because, from a cognitive perspective, learning is believed to result from internal mental activity rather than from something imposed from outside the learner (Ellis 1990). McLaughlin (1990) characterizes the cognitive approach to second-language acquisition as follows:

1. Cognitive psychology emphasizes *knowing* rather than *responding* and is concerned with studying mental processes involved in the acquisition and use of knowledge. "The focus is not stimulus-response bonds, but mental events" (p. 113).
2. The cognitive approach emphasizes *mental structure* or *organization*. Cognitive psychology assumes human knowledge is organized and that anything new that is learned is integrated into this structure.
3. Cognitive theory, as opposed to Behaviorist theory, views the learner as one who acts, constructs, and plans rather than simply receives stimuli from the environment. Therefore, a complete understanding of human cognition would require an analysis of strategies used for thinking, understanding, remembering, and producing language.

According to Cognitive theory, second-language learning is seen as "the acquisition of a complex cognitive skill" (McLaughlin 1987, p. 133). For a language learner to become proficient, subskills of this complex task must be practiced, automatized, integrated, and organized into internal representations, or rule systems, that are constantly restructured as proficiency develops.

Automatization refers to the process of making a skill routine through practice. McLaughlin (1987) explains the way this is thought to occur using an information processing model developed by Shiffrin and Schneider (1977). In this model, memory is thought to consist of a large number of "nodes" that become associated with one another and activated in sequence through learning. In *automatic processing,* certain nodes are activated almost every time a certain input is presented. This activation pattern has been built up through consistent practice so that it becomes a learned response over time. Once such an automatic response is learned, it occurs quite quickly and is difficult to suppress or change (Shiffrin and Schneider 1977, pp. 155–56).

In *controlled processing,* memory nodes are activated in a given sequence on a temporary basis—that is, the response has not yet been "learned" or automatized. For the response to happen, the learner has to give the process his full attention. It is difficult, therefore, to do "controlled" tasks if there is any distraction or interference.

Shiffrin and Schneider speculate that for the development of "complex information-processing skills," such as learning to read, learners would use controlled processing first, laying down "stepping stones of automatic processing" as they move from lower to higher levels of learning:

> *In short, the staged development of skilled automatic performance can be interpreted as a sequence of transitions from controlled to automatic processing (p. 170).*

Schmidt (1992) points out that although "automatic" and "controlled" processing were originally thought of in terms of a dichotomy, more recent discussions of these concepts suggest that they really should be viewed as ends of a continuum. He emphasizes the role of *practice* in moving new material along this continuum, affirming the earlier speculations of Shiffrin and Schneider, cited above:

> *The development of skilled behavior involves a shift with practice from controlled to automatic processing. Novices of all kinds, including beginning L2 learners, must pay careful attention to every step of the procedure, whereas experts do not (Schmidt 1992, p. 360).*

In discussing the development of speaking fluency, he suggests that various levels of processing may actually be used simultaneously, a point that Shiffrin and Schneider (1977) also make when referring to complex processing such as reading (see p. 161). Schmidt argues that, rather than thinking of the processing of speech as sequential in nature, it should be seen as a type of "parallel" processing. He cites Levelt's (1989) assertion that if it did not involve parallel processing, "speaking would be more like playing chess: an overt move now and then, but mostly silent processing" (Levelt 1989, p. 27, cited in Schmidt, p. 376). Schmidt adds that for novice speakers, it is indeed the case that "speaking sometimes does seem to require as much thought and effort as planning a chess move" (p. 376). Those of us who have taught beginning language learners can testify to the truth of this observation; it should also lead us to consider the possibility of giving learners more time to plan their discourse when asking them to express their own meaning in the foreign language in beginning and intermediate classes.

The distinction between controlled and automatic processing can be useful as one considers the various tasks involved in second-language learning. Tarone (1982, 1983) describes a whole range of language "styles" that learners produce when engaged in various kinds of tasks. The *vernacular style,* represented by informal use of the language with little attention to form, is produced when language is being processed automatically. The *careful style,* on the other hand, is elicited when learners engage in heavy monitoring and/or attention to the form of their production. This monitoring represents a more controlled processing of the lan-

guage needed to accomplish the task. Tasks that demand such monitoring include grammaticality judgments or form-focused production activities of various kinds. Tarone (1982) explains that the learners' interlanguage system should be thought of as a *continuum,* ranging from the vernacular to the careful style, and does not, as Krashen (1982) has claimed, consist of two discrete systems differentiated on the basis of whether attention to form is conscious or subconscious.

The "variability" of learner language is evident when students at different proficiency levels engage in tasks of different types. Teachers may have noticed this phenomenon of variability when their students perform differently while doing a discrete-point grammar task on a test or for an assignment than they do when using the language more naturally or informally in conversation or in free composition. Tarone (1987) adds that other factors, such as the identity or the role of the learner's conversational partner, the topic of conversation, the mode of discourse (i.e., the functions that are being performed, such as giving directions, description, narration, argumentation, and the like), and other task or situational variables can have an effect on the accuracy of the language produced. Rather than feeling frustrated and confused by this phenomenon, teachers and students might be encouraged by a view of language learning such as this that accounts for such differences in performance.

While Shiffrin and Schneider contrast controlled and automatic processing, Ellis (1990) adds Anderson's (1980, 1995) distinction between *declarative* and *procedural* knowledge as another way to look at how information is processed and stored. *Declarative knowledge* is explicit and conscious, and can be articulated by the learner. It involves "knowing that" (e.g., definitions of words, facts, rules). *Procedural knowledge,* on the other hand, is "knowing how" (e.g., how to produce language as one performs linguistically). This type of knowledge might be more or less implicit or explicit, conscious or unconscious, or relatively controlled or relatively automatic in nature (see Anderson 1995 for a thorough discussion of these two types of knowledge). Anderson's model of skill acquisition consists of three stages: (1) the cognitive stage, where learners use conscious declarative knowledge; (2) the associative stage, where they start to proceduralize this knowledge; and (3) the autonomous stage, where performance becomes more or less automatic and errors disappear (Anderson 1995, pp. 273–275). All of these models attempt to explain the processes by which learning becomes internalized and eventually "automatic," but each looks at the processes involved in somewhat different ways.

Cognitive theory further maintains that there is more to developing a complex skill than automatizing the sub-skills of which it is comprised (McLaughlin 1987). The learner also has to impose an organizational structure on the new information that is constantly being added to the system. As new information is learned, the organization of the existing information might have to be changed, or "restructured," to accommodate what is new. That is why both *automatization* and *restructuring* are key concepts in this view of language learning (pp. 134–136).

The idea of the development of internal "structures" or organized cognitive systems and networks is central to views of learning that derive from Cognitive

theory. Cognitive psychologists have tried to explain, from a psycholinguistic viewpoint, how such internal representations of the foreign language develop within the learner's mind. Other cognitive theorists, working from an educational perspective, have sought to describe ways in which teachers can organize instruction so that learning is enhanced. One early proponent of applying general principles of cognitive psychology to educational contexts was David Ausubel (1968), who emphasized the importance of active mental participation by the learner in meaningful learning tasks. Central to his understanding of learning was the concept of "cognitive structure," which he defined as "the total content and organization of a given individual's ideas; or, in the context of subject-matter learning, the content and organization of his or her ideas in a particular area of knowledge" (Ausubel, Novak, and Hanesian 1978, p. 625). Cognitive structure, in Ausubel's view, is organized hierarchically. In meaningful learning, new knowledge is related to existing cognitive structure via subordinate or superordinate relationships, or by "combinations of previously learned ideas" (p. 59). Thus the addition of new information implies a reorganization or "restructuring" of the system: "In meaningful learning the very process of acquiring information results in a modification of both the newly acquired information and the specifically relevant aspect of cognitive structure to which the new information is linked" (Ausubel et al. 1978, p. 57).

In discussing types of learning that occur in classrooms, Ausubel makes an important distinction between "rote" and "meaningful" learning. Rote learning is arbitrary and verbatim; that is, the material to be learned is not integrated or "subsumed" into one's "cognitive structure" but is learned as an isolated or discrete piece of information. In this way, the cognitive system is not restructured because the new information does not become integrated. For example, learning lists of paired words—a task that is commonly used in verbal learning experiments—would constitute rote learning since the words are not related to one another meaningfully. Ausubel et al. (1978) note that some classroom learning, such as foreign language vocabulary learning, "does somewhat approach the rote level" (p. 28), but it might best be thought of as "a primitive form of meaningful learning" (p. 28) since the association between the new word and a meaningful concept does exist. However, it is possible to learn "potentially meaningful" material rotely—that is, in a verbatim form without trying to relate it meaningfully to what one already knows. Vocabulary words or dialogue lines that are memorized rotely but that are not integrated into existing cognitive structure might easily be lost later. Conversely, some rotely learned material might be available for years, but such material can only be reproduced verbatim if it is not integrated into the cognitive network in some way. Rotely learned information cannot be changed or paraphrased unless it is processed meaningfully.

Meaningful learning, on the other hand, is relatable to what one already knows and thus can be easily integrated into one's existing cognitive structure. One might illustrate this integration of knowledge with a foreign language learning example: If one knows that in French, descriptive adjectives agree in gender and number with the noun they modify, the new information that possessive ad-

jectives also agree in this way can easily be mastered and retained. In this instance, the concept of adjective agreement might be thought of as the "subsumer," or "anchoring idea" (p. 170), and the possessive adjective agreement rule would be subsumed under it in cognitive structure. Perhaps the same student will study Spanish the following year. The rule that Spanish descriptive adjectives agree with the nouns they modify can then be subsumed via correlation with the French agreement rule.

Ausubel also stresses that in order for learning to be meaningful, the learner has to have an intention to learn—that is, a willingness to approach the learning task with the intention of relating the new material meaningfully to what is already known. A potentially meaningful bit of information might be learned rotely if the learner approaches it as a rote (i.e., verbatim) task and does not relate it to other information he/she already has. In Ausubel's view, learning must be meaningful to be effective and permanent.

How can teachers enhance the meaningfulness of new material for students and increase the chances that it will be anchored to what is already known? Ausubel suggests that the material be organized so that it is more easily relatable to previously learned material. New material should also be sequenced appropriately so that it can be integrated into previous knowledge. He recommends the use of advance organizers, which are introductory materials at a high level of generality presented in advance of the new material to be learned. Such organizers will facilitate the learning process by providing a kind of general anchoring idea to which the new knowledge can be attached—to "*bridge the gap* between what the learner *already knows* and what he *needs to know* before he can meaningfully learn the task at hand" (Ausubel et al. 1978, pp. 171–172). Ideas such as these underlie "cognitive approaches" to methodology, treated in Chapter 3.

Illustration 2.6 summarizes some of the assumptions underlying Cognitive theory, as represented by the various perspectives described in this section.

CRITIQUE:

How does Cognitive theory hold up under critical scrutiny among the competing theories discussed thus far? McLaughlin's (1987) critique includes several cautionary statements. First, conceiving of language learning as a "complex cognitive skill" is not comprehensive enough. Language learning also involves acquiring a "complex linguistic skill" (p. 150). By itself, Cognitive theory is not capable of explaining some of the constraints on the development of language that may result from linguistic universals, for example. McLaughlin believes that Cognitive theory needs to be linked to linguistic theories of second-language acquisition. If both viewpoints are explored together, a cognitive perspective of language learning might become more powerful. For example, the understanding of "restructuring" in second-language acquisition would be more comprehensive and enriched by research into the linguistic details of the restructuring process. Cognitive theory also does not predict explicitly when certain features of a first language will be transferred to a second language or explain why certain features do not transfer. Linguistic theory may make more specific predictions, thus adding information about language learning that Cognitive theory alone cannot provide.

Illustration 2.6
Summary: Cognitive Theory

Summary: Cognitive Theory

1. Learning results from internal mental activity. Language learning is a type of general human learning and involves the acquisition of a complex cognitive skill.
2. Subskills involved in the complex task of language learning must be practiced, automatized, and integrated into organized internal representations, or rule systems, in cognitive structure.
3. Internal representations of language are constantly restructured as proficiency develops.
4. Skills are automatized (learned) only after they have first been under "controlled processing." Controlled processing, which requires attention to the task, leads to automatic processing, where attention is not needed to perform the skill (Schneider and Shiffrin 1977; Shiffrin and Schneider 1977; McLaughlin 1987).
5. Some researchers (Tarone 1982, 1983; Ellis 1985) maintain that learners' production is variable, depending on the degree of attention they pay to language form as they carry out various tasks. Informal tasks that demand little active attention elicit the "vernacular style," while tasks that require active attention and monitoring elicit the "careful style."
6. Some cognitive theorists (Anderson 1980, 1995; Ellis 1985) distinguish between *declarative* knowledge, which involves "knowing that," and *procedural* knowledge, which involves "knowing how."
7. Ausubel (1968, 1978) emphasizes that *meaningful learning*, which is learning that is relatable to what we already know, is preferable to *rote learning*, which is arbitrary and verbatim. Only *meaningful* material can be integrated into existing cognitive structure.

Ellis (1990) adds that although Cognitive theory is much more convincing than Behaviorism, it is not able to account satisfactorily for the fact that there are quite a number of regularities in the way in which second-language knowledge is acquired in classroom learning. Although it is important and appropriate to extrapolate from general Cognitive theory when looking at classroom language learning, Ellis feels that second-language learning might be different from other kinds of learning (such as learning history or science) in some important ways. This view is congruent, at least in part, with what Universal Grammar theory is saying about language learning being a specialized kind of competence and not just a subset of general human learning. As with most other theories discussed in this chapter, applications from Cognitive theory must be explored and tested more thoroughly in the years ahead to determine its value in understanding how people become proficient in a second language.

Connectionism: A New Challenge to Rationalist Models of Cognition

The rationalist models described in the last section share a common belief that language is rule-governed behavior and that language learners, therefore, develop complex, internalized rule systems that can be represented symbolically (Gasser 1990). In the past few years, there has been increased interest shown in *connectionist* models of the mind which challenge "traditional symbolic models of cognition" (Gasser, p. 179). Connectionist theorists have attempted to base their models on what is known about the function of the human brain. According to McClelland (1989), the term "connectionist models" was introduced by Feldman (1981) to refer to those models of the mind that describe mental processing by means of connections among very simple processing units. McClelland and other scholars have been interested in determining what kind of processing mechanism the mind really is. Does the human brain process information one step at a time, in a serial or sequential manner, like a conventional computer? Or does it engage in processing information throughout a network of simple processing units that "fire off" simultaneously? Neuroscience indicates that the human brain consists of "some tens of billions of neurons" (McClelland 1989, p. 8) which are available for processing human thought and perception. Neurons are thought to be "relatively sluggish, noisy processing devices, compared to today's computers" (p. 8), yet the mind is capable of recognizing objects or perceiving a complex visual scene in an instant. How are these two facts about mental processing reconciled? McClelland and his colleagues argue that interconnected processing units would have to work in a parallel rather than in a serial manner to achieve such rapid results. Therefore, the mind must be a parallel, rather than a sequential, processor of information.

parallel processor

Theoretical models of mental processing that are based on a parallel view are known as parallel distributed processing (PDP) models, neural models, or connectionist models (McClelland 1989). Connections between simple processing units are thought to have different strengths or "weights." In connectionist models, *learning* consists of adjusting the strengths of connections so that a given "teaching input" eventually results in a desired "output" (Pinker and Prince 1989). That is, connections are either strengthened or weakened in response to regularities in patterns of input that are presented to the system (Gasser 1990). Thus the network of connections is "trained" to make certain associations between inputs and outputs. As Rumelhart and McClelland (1986a) explain, "*knowledge is in the connections* rather than in the units themselves" (p. 132).

Thus connectionist models of the mind do not posit discrete symbols or rules as conceptual or "higher-order" units or sets of units surrounded by a clear boundary; rather, knowledge consists of "fluid patterns of activation across portions of a network" (Gasser 1990, p. 180). Where rationalist models of cognition describe a kind of "central executive" that oversees the general flow of processing, choosing rules or principles to be applied and executing them, connectionist models consider the control of information processing to be distributed among the many parts of the network (Rumelhart and McClelland 1986a, p. 134). As Gasser (1990)

explains, "there are no rules to be executed" (p. 181). Larsen-Freeman and Long (1991) add that "the networks control what looks like rule-governed behaviour, but which is simply a reflection of the connections formed on the basis of the relative strengths of various patterns in the input" (p. 250). This perspective of cognition is thus quite different from that of rationalist theories such as Universal Grammar, Monitor theory, or Cognitive theory.

An early example of how a connectionist model might work in language acquisition is described by Rumelhart and McClelland (1986b) and summarized as follows by Pinker and Prince (1989). Rumelhart and McClelland demonstrated that their computerized network model, which had not been programmed with any grammatical rules and had no representations of words, verb stems, suffixes, or conjugation patterns within it, could "learn" to use regular and irregular English past tense verb forms correctly simply by comparing its own version of the past tense forms with the correct versions provided by the "teacher" over an extensive number of trials. The network simply adjusted the strengths of the connections between processing units until the difference between inputs and outputs was sufficiently reduced. The PDP system thus demonstrated rule-like behavior without having any rules. Furthermore, the system exhibited some of the same types of behavior that young children exhibit when learning the verb system of English: First, children use past tense forms (both regular and irregular) correctly; then, as they overgeneralize the *-ed* ending from regular to irregular verbs, they produce incorrect forms like "goed" or "broked"; finally, they work out the rule system and begin to produce both regular and irregular verb forms correctly. The Rumelhart and McClelland demonstration seems to suggest that associationist theories of language acquisition, such as those the behaviorists espoused in the 1950s, might have some merit (Pinker and Prince 1989, p. 183). However, Pinker and Prince take exception to the Rumelhart-McClelland model and point out some empirical flaws, which, in their view, weaken the case of a connectionist account of language behavior. Some of their arguments are summarized in the *Critique* section, below.

CRITI

Because connectionist models are so new, it is difficult to characterize a connectionist perspective on linguistics or second-language learning at this point other than in very general and tentative terms. One observation that might be made is that in all of the demonstrations of learning with computerized networks discussed earlier and in the next section, the form of the input provided to the computer is very controlled and limited to selected words or short sentences repeated over many trials. Some simulations have used artificial languages for input. Ellis and Schmidt (1997) note that their own use of an artificial language in a connectionist demonstration is "indeed a travesty of natural language," since natural language is far more chaotic in its presentation of data to learners (p. 158). Even when a natural language (such as English or French) is used, its presentation to the network is still far more controlled than in normal language use situations. Thus it is difficult to know how much one might be able to extrapolate from these learning simulations to the real world of second-language learning, even in the controlled environment of the classroom.

A second observation is that many connectionist models have a built-in "back-propagation" capability (Ellis and Schmidt 1997, p. 155) which provides feedback to the network after each learning trial about how close its own output comes to the target output. It is this feedback that is used in adjusting the weights of the connections that result in learning. As Altmann (1997) describes such networks, they cannot learn anything without the equivalent of a teacher and corrective feedback, or "negative evidence." However, as we saw earlier, some studies conducted on the type of feedback available to children learning a first language suggest that negative evidence is not always provided to them when they make grammatical errors. Therefore, many artificial learning networks, dependent as they are on both "positive evidence" (or input) and "negative evidence" (or corrections of error) in order to be successful language learners, do not appear to learn languages the way that children do. (It is still a matter of some debate in the second-language research community whether negative evidence is necessary or useful in second-language acquisition.) More recent connectionist networks have been designed without back-propagation as part of their "architecture"; however, studies using these newer types of networks have led to differing conclusions about how such networks learn (see Marcus 1998, commenting on research using the Elman connectionist model, described in Elman et al. 1996). For a discussion of various types of connectionist models, see Altmann (1997).

Illustration 2.7 summarizes some of the points made in this discussion. For a more thorough treatment of this theory, see the sources cited in this and the following section.

CRITIQUE:

Because input and learning through association plays so crucial a role in the development of knowledge in connectionist models, various scholars have placed this theoretical perspective in the empiricist camp (see, for example, Pinker and Prince 1989; Gasser 1990; Larsen-Freeman and Long 1991). Gasser (1990) points out that some scholars have seen it as a new form of behaviorism. Interestingly, Rumelhart and McClelland (1986a) maintain that PDP models are "quite agnostic about issues of nativism versus empiricism" (p. 139). They suggest that connectionist systems can be viewed from either a nativist or an empiricist world view. The extreme nativist view would suggest that all the interconnections were genetically predetermined, or "wired in," at birth; the extreme empiricist view would hold that there are no predetermined limits on the way the system's network of interconnections might be constituted. A third possibility would be an interactionist perspective, where the nature of the system might be genetically determined but where all the connections could be modified as the person interacted with the environment. Rumelhart and McClelland seem to favor this third perspective and suggest that "there is probably a good deal of genetic specification of neural connection, and there is a good deal of plasticity in the pattern of connectives after birth" (p. 140, note 6). Because many scholars seem to categorize connectionist theory as environmentalist, it has been placed on the left-hand side of the continuum in Illustration 2.2.

As mentioned earlier, various researchers have identified some problems with

Illustration 2.7
Summary: Connectionism and Parallel Distributed Processing (Based on Rumelhart and McClelland 1986a; McClelland 1989; Gasser 1990; Larsen-Freeman 1991)

Summary: Connectionism and Parallel Distributed Processing

1. Connectionist theory assumes no innate endowment or mechanism specifically pre-programmed for language learning.
2. Learning consists of the strengthening of connections between and among simple processing units in complex neural networks.
3. Cognitive processing is assumed to occur in a parallel and distributed fashion throughout the network rather than in a sequential or serial fashion.
4. Knowledge is in the connections rather than in the processing units themselves.
5. The strength of connections is determined by the relative frequency of patterns in the input.
6. There are no "rules" in connectionist systems, although they exhibit regular or "rule-like" behavior.

PDP models (see, for example, Fodor and Pylyshyn 1988; Lachter and Bever 1988; Pinker and Prince 1989; Marcus 1998). Pinker and Prince argue that "the fact that a computer model behaves intelligently without rules does not show that humans lack rules, any more than a wind-up mouse shows that real mice lack motor programs" (p. 184). In their view, PDP models of language and cognition are incorrect for several reasons. They claim, for example, that the Rumelhart-McClelland model has nothing corresponding to various formal linguistic notions such as *segment* or *string* (relating to phonemes) or to *stem, affix,* or *root* (relating to word formation), making it difficult for the model to distinguish among similar-sounding words. There is also nothing in the model corresponding to constructs such as *regular rule* or *irregular exception*. The authors claim that the model makes wrong predictions about the kinds of rules that would be easy to learn versus those that would be difficult, adding that the computerized model seems to learn bizarre, non-existent rules for forming the past tense as easily as it learns simple, very common rules. Thus it does not seem sensitive to psychologically significant differences between regular and irregular verbs. (See Marcus 1998 for further comments on this problem.)

An additional problem identified by Pinker and Prince relates to the way in which the computerized model begins to make overgeneralization errors in producing past-tense forms. Whereas overgeneralization in the model is triggered by a large influx of regular verb forms into the teaching presentation in stage two, the onset of overgeneralization in children is not associated with changes in the ratio of irregular to regular verb forms in the input. Rather, overgeneralization errors seem to be triggered by some internal changes in the child's language mechanisms. Pinker and Prince believe that "the Rumelhart-McClelland model is an extremely important contribution to our understanding of human language mechanisms" (p. 192) and that the flaws they see in the model provide further insights into how language acquisition occurs.

While some scholars consider PDP models problematic, others see them as representing an interesting alternative view of cognition that is worthy of further ex-

ploration (see, for example, Gasser 1990, who has proposed a connectionist framework for second-language acquisition research). Some recent research and scholarly discussions of connectionism include the work of Sokolik (1990) and Sokolik and Smith (1992), who trained a connectionist network to distinguish the gender of French nouns; Ellis and Schmidt (1997), who argue that the acquisition of morphology and syntax in a second language is compatible with the associative learning described by connectionist theory; and Ellis (1998), who maintains that very complex language representations can "emerge" from the interaction of simple learning mechanisms when exposed to complex language data.

Whatever the merits and problems of connectionist accounts of learning might be, this new perspective on cognition presents an interesting challenge to the symbolic/rationalist perspectives that have been dominating our field since the 1960s.

The Role of Individual Learner Factors in Second-Language Learning

Most scholars and practitioners in the field today agree that both the rate and the degree of success of second-language learning is affected by individual learner differences (Ellis 1985). Many also believe that learner factors such as age, aptitude, attitude, motivation, personality, cognitive style, and preferred learning strategies need to be considered in any comprehensive theory of second-language acquisition. Ellis (1985) remarks that SLA researchers may acknowledge the importance of such factors in the eventual attainment of advanced levels of proficiency or in approaches to specific tasks, but research on acquisition orders (or the *route* of SLA) has tended to ignore individual differences or minimize their importance (p. 99). The conventional wisdom, it seems, has been that second-language acquisition theories should attempt to explain how "the learner" develops competence, as though learners were a relatively homogeneous lot. This assumption, however, is being challenged as more and more scholars recognize that differences among people might matter a great deal more than we had once thought.

In recent years, various publications have dealt with the importance of individual learner factors in language learning (see, for example, McLaughlin 1983, 1987; Birckbichler 1984; Ellis 1985, 1990; Brown 1987; Wenden and Rubin 1987; O'Malley and Chamot 1989; Stevick 1989; Tarone and Yule 1989; Galloway and Labarca 1990; and Oxford 1990). Studies of learner characteristics have looked at how various kinds of factors might affect "success" with language learning, as well as learners' approaches to different language learning tasks and students' attitudes toward specific learning environments and situations.

In some of the earlier research on learner characteristics (Naiman, Frohlich, and Stern 1975; Rubin 1975; Stern 1975), investigators were interested in identifying what "good" language learners did or what types of characteristics they had. The intention was to see if some of these characteristics and strategies could be taught to learners who were not so successful. But as Stevick (1989) points out, the

search for one definitive set of characteristics that would identify "good" learners from "poor" ones may have begun with a faulty premise. Stevick conducted interviews with a number of language learners who had achieved superior levels of proficiency in a variety of languages. He had hoped to identify how they were alike so that we might "teach their secrets to our students" (p. xi). As he began to analyze his interview data, however, he found that successful learners were even more different from one another than he had expected. It seems that even "good" learners" are a rather heterogeneous lot!

Though perhaps disappointing from the point of view of the researcher interested in identifying a formula for "success," Stevick's findings are also quite positive, in that "many of the things [successful learners] were describing fitted well with one or another abstract, theoretical concept in the field" (Stevick 1989, p. xi). Although no one theoretical model of second-language acquisition was unambiguously supported, each model was confirmed in some ways by the interview data he collected.

Galloway and Labarca (1990) have provided an excellent review of recent literature about the host of learner factors that should be considered in any theoretical or practical discussion of second-language learning. In their introduction, the authors note that educators often feel challenged, if not irritated, by differences, irregularities, or change. Dealing with individual differences in the classroom might seem a daunting problem for many teachers, who face multiple classes (with multiple preparations) every day with 20 or 30 students in each class. Yet most everyone agrees, at least in principle, that students must be treated as individual *persons* who have differing needs, styles, and preferences.

What are some of the specific ways in which learners differ? Galloway and Labarca (1990) discuss learner differences in several categories. First, they contend that people sense things differently, responding to the physical environment around them (time of day, degree of comfort, degree of physical activity, amount of light, etc.) in diverse ways. People also tend to learn best through one or a combination of sensory modalities (through the ears, through the eyes, through touch, through movement). It follows that methodological decisions that limit use of a preferred modality will be ill-suited to a significant subset of learners.

For example, if the method prescribes that input to the learners will be primarily auditory in the beginning phases of instruction, learners who depend on visual information may be disadvantaged. Teachers need to consider such modality preferences and use a multi-sensory approach, appealing to all types of learner preferences. "What is called for is not a teaching method, but a teaching repertoire" (Galloway and Labarca 1990, p. 115).

A second way in which learners differ is in their social preferences. Some people prefer learning with others, interacting in small groups or engaging in competitive activities. Others may prefer learning alone and are energized by opportunities to read or do individual projects.

A third variable is the way in which learners tend to process information mentally. Various cognitive style differences have been explored in the literature. Some learning style dimensions include *field independence* (or the degree to which

one perceives things globally or analytically), *impulsiveness/reflectiveness* (relating to the speed with which one makes decisions), *systematicness/intuitiveness* (or the preference for following a sequential plan vs. developing one's ideas freely and holistically), *tolerance of ambiguity* (relating to the comfort or lack of comfort one feels in the face of uncertainty), and *flexibility/inflexibility* (relating to the ability to think of many alternative solutions vs. the tendency to focus on one "right" answer). For a review of these and other cognitive style dimensions, see Abraham (1978), Claxton and Ralston (1978), and Birckbichler (1984).

Galloway and Labarca (1990) and Oxford (1990), as well as other researchers studying learner factors, also point out that people adopt different learning strategies as they approach particular tasks. "Learner strategies are task-specific tactics or techniques, observable or nonobservable, that an individual uses to comprehend, store, retrieve, and use information or to plan, regulate, or assess learning" (Galloway and Labarca 1990, p. 141). Many learners are not aware of the strategies that they use to approach a task and would profit, perhaps, from making them explicit. Hosenfeld (1979) did a fascinating study with a high school learner named Cindy who became aware, through strategy training, of her own approach to reading in French as well as to the approach of another student she was studying as a model of a successful reader. After eight sessions with the researcher, thinking aloud while she read and talking about her strategy use, Cindy exhibited some new and effective reading strategies that she had not used previously. Readers interested in learning more about the types of strategies learners typically use should consult such sources as Oxford and Ehrman (1989), O'Malley and Chamot (1990), Oxford (1990), and the other sources mentioned above.

The professional literature of the last three decades is replete with information about learner styles, strategies, and personality differences. Yet how does one accommodate these differences in the second-language classroom? For many practitioners, the very idea of individualizing one's instruction "evokes the defeating image of one-on-one instruction guided by 150 variations on a lesson plan" (Galloway and Labarca 1990, p. 129). Rather than start by trying to identify and meet the needs of all learners in the classroom simultaneously, Galloway and Labarca suggest that we begin by attending to *some* of the needs of *all* of our learners. They advocate "learner-friendly" environments where the teacher makes a concerted effort to arrange instruction so that it is meaningful for learners and fosters their independence. By helping students to become aware of their own strategies and learning preferences, as well as guiding them expertly to become effective and autonomous learners as they approach various learning tasks, teachers can go a long way toward accommodating individual learner needs more effectively.

Relating Theory to Practice: Some Considerations

This chapter has presented a range of theoretical viewpoints about how adults learn second languages. The sample of theories is not meant to be exhaustive, but rather represents differing viewpoints along the rationalist-empiricist contin-

uum. In reviewing various theories of language learning such as these, teacher can become familiar with some of the premises underlying various approaches to language teaching methodology that have been proposed across the years. In addition, Ellis (1997) suggests that SLA theory and research can be a useful resource for teachers as they articulate their own personal theories of language teaching.

One way to relate theory to practice is to consider some of the elements of language teaching that are common to a variety of methods and examine them in the light of different theoretical perspectives. One might then begin to see that the same teaching technique or instructional element can be motivated by different underlying theoretical premises. Take, for example, the role of *practice* in language learning. For the behaviorist, practice is essential because learners need to form new habits (stimulus-response associations) in the second language; this is achieved through massive repetition so that "overlearning" of the new material will occur. For the cognitive theorist, practice is essential for a somewhat different reason: It is needed in order to move from "controlled" to "automatic" processing. Schmidt (1992), for example, discusses the development of language fluency in terms of this controlled/automatic continuum:

> *Practice seems to be the necessary condition for fluency in an L2, and this is given a theoretical justification in models of automatization (p. 362).*

This view of the necessity of practice contrasts with Krashen's (1982) beliefs about the need for practice in speaking:

> *The Input Hypothesis makes a claim that may seem quite remarkable to some people—we acquire spoken fluency* not *by practicing talking but by understanding input, by listening and reading. It is, in fact, theoretically possible to acquire language without ever talking (Krashen 1982, p. 60).*

It is important to add, however, that Krashen does allow for a role for speaking (or "output") in that learners' participation in conversations with native speakers can help students obtain more comprehensible input. He also sees a role for output in language *learning,* "although even here it is not necessary" (p. 61). Thus in three different theoretical frameworks, the same essential element of language teaching is cast in a somewhat different light, and a different rationale for the use of that element is given.

Another element of language teaching that has been open to much debate is the role of *corrective feedback* (or "negative evidence") in language acquisition. From a behaviorist perspective, negative evidence is essential for learning so that the wrong language habits are not formed. For those who believe that Universal Grammar has an important role to play in second-language acquisition, "positive evidence" (or input) is far more important in language learning, while negative evidence may be of little use, at least where "core grammar" is concerned. For Krashen, error correction is useful only for "learning" but is of little or no use for "acquisition" (Krashen 1982, p. 117). Cognitive theory might see an important role for feedback, in that learners' hypotheses need to be shaped by both positive

and negative evidence in order for "restructuring" to occur. As we have seen in the discussion of connectionist models of language learning, many of the computer models provide a "feedback" mechanism that compares the output that the network produces to the previously stored "correct" output so that the connection strengths can be properly adjusted for learning. Again, a common element in language teaching may be considered necessary or unnecessary, depending on one's theoretical viewpoint.

As we saw in the last part of the chapter, the theoretical models and empirical studies that teachers evaluate need to be considered as well in the light of the important consideration of learner differences. Some models of SLA have traditionally minimized the role of individual differences. According to Gass and Selinker (1994), "[t]he immediate negative reaction linguists have toward differences in language abilities in a native language has presumably also affected second language scholars trained in linguistics" (p. 234). They contend that behaviorists and psycholinguists have not wanted to consider such factors as motivation or affect either, and many researchers in SLA and related fields have been skeptical about instruments used in measuring such characteristics as aptitude, motivation, attitude, field independence, ambiguity tolerance, personality differences, and the like. Nevertheless, many teachers and specialists in the field of foreign and second-language teaching believe that individual differences have an important role to play in language learning. This may be an area where SLA researchers and language teachers have a different perspective on teaching practice. While experimental research often does not build individual difference factors into study designs, but treats them as part of "error variance," teachers in classrooms must deal with individual differences on a daily basis.

Ellis (1997) discusses how the relationship between SLA research and language pedagogy has been somewhat problematic since the field of SLA began to develop a number of years ago. He points out that researchers in second-language acquisition have often been reluctant to apply their research results directly to language pedagogy, particularly as the field of SLA is still in its infancy and "there are still few certainties" (p. 70). This caution makes sense particularly when research studies are conducted under specific conditions that do not have much congruence with those in one's own classroom, or when study designs are limited in a variety of ways or results are not replicated.

Ellis also discusses the fact that SLA researchers and language teaching practitioners often have different issues that concern them and different types of discourse for discussing those issues. He argues that "what has been missing in SLA is an educational perspective" (p. 71), where issues that are addressed by research have more specific relevance to what is of concern to teachers and arise from issues that teachers themselves consider important. Although there has been an increasing interest in classroom-based research in SLA, Ellis points out that much of it is not actually conducted in classrooms or is not always reflective of problems that teachers themselves find interesting or important. He adds that it is up to teachers to appraise the value of SLA research based on their own experience. Thus, instead of accepting theoretical frameworks or empirical findings as author-

itarian or prescriptive in nature, practitioners and applied linguists can "draw SLA research and theory to initiate, tentatively or confidently, various pedag proposals" (p. 76). They can also evaluate their own teaching in light of what t know about language learning from research, or examine particular pedagog practices in terms of how they are or are not congruent with particular theorie language acquisition with which they are familiar.

Summary: On Learning a Language

In this chapter, various models of second-language acquisition have been selec for discussion from among the many theoretical viewpoints that have been vanced in the field in recent years. The highlights of five theoretical perspecti chosen to represent different points along the rationalist-empiricist continu were reviewed and summarized. Earlier in the chapter, the issue of individ learner factors and their role in language learning and instruction was briefly cussed. As we consider the question: "How do adults become proficient i second language?", the only certainty is that the question is tremendously co plex. Yet the strides that we are making as a profession to answer that quest have been encouraging, as research into SLA is flourishing, and the insights have gained into the nature of the learning process bring promise for the cont ued improvement of our teaching.

In the next chapter, a set of hypothesized principles of instruction that are rived from concepts in Chapters 1 and 2 will be presented and discussed. We then consider various approaches to teaching that have been prevalent in the p fessional literature over the years with a view to understanding their underly assumptions and essential characteristics. It is hoped that this review of prin ples, premises, and priorities will enable second-language teachers to articul more clearly their own convictions about language learning and teaching, a evaluate the many options that are available to them as they plan instruction t is responsive to the needs of their students.

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Activities for Review and Discussion

1. Go back to Illustration 2.1 and answer the questions in the Discussion Guid to assess some of your own beliefs about second-language learning theory. Then, in small groups, compare and discuss your answers.
2. For each of your answers in the Discussion Guide in Illustration 2.1, identify

the theoretical approach in this chapter with which your viewpoint is compatible. (Some views may be compatible with more than one theory.) Then analyze your own answers to the questionnaire to see if you currently favor one theoretical viewpoint over others. Do you lean toward the empiricist or the rationalist end of the continuum shown in Illustration 2.2?

3. Choose three theoretical approaches described in this chapter and review the main premises associated with each one. (You may want to consult the summary tables at the end of each description.) Then, for each of the three theoretical points of view, make a list of teaching practices that you think would be compatible with that approach. Compare your three lists. Are there practices that would be compatible with all three theories? Are there practices that would be compatible with only one? Explain your answer briefly.
4. Think about the way you approached the learning of a second language, either on your own or in a formal classroom setting. What theoretical approach described in this chapter best characterizes your learning experience? Were there aspects of that learning experience you would like to change if you were to begin the study of a new language? Explain your answer briefly.
5. Many second-language educators believe that learner characteristics play an important role in language learning. How might you deal with individual differences in your classroom? What are some practical ways in which you might accommodate learner differences in preferred learning style, personality, or strategy use?

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