1

INTRODUCTION

The Nature of Theories

Bill VanPatten and Jessica Williams

Almost everyone has heard of Einstein's Theory of Relativity. People have also heard of things such as the "Theory of Evolution" and "Atomic Theory." What is common to all these theories is that they are theories about what scientists call *natural phenomena*: things that we observe everyday. Theories are a fundamental staple in science, and all advances in science are, in some way or another, advances in theory development. If you asked scientists, they would tell you that the sciences could not proceed without theories. And if you ask applied scientists (such as those who develop medicines or attempt to solve the problem of how to travel from Earth to Mars), they would tell you that a good deal of their work is derived from theoretical insights.

Theories are also used in the social and behavioral sciences, such as psychology, sociology, and economics. As in the natural sciences, social sciences attempt to explain observed phenomena, such as why people remember some things better than others under certain conditions or why the stock market behaves the way it does.

In the field of second language acquisition (hereinafter SLA) research, theories have also come to occupy a central position. Some researchers, though by no means all, would even say that the only way SLA can advance as a research field is if it is *theory driven*. The purpose of the present book is to introduce the reader to certain current theories in SLA and provide a background for continued in-depth reading of the same. As a starting point, we will need to examine the nature of theories in general.

What Is a Theory?

At its most fundamental level, a **theory** is a set of statements about natural phenomena that explains why these phenomena occur the way they do. In the sciences, theories are used in what Kuhn (1996) calls the job of "puzzle solving."

By this Kuhn means that scientists look at observable phenomena as puzzles or questions to be solved. Why does the earth revolve around the sun and not fly off into space? Why are humans bipedal but gorillas knuckle-walkers? These are all questions about things that confront us every day, and it is the job of scientists to account for them.

In short, then, the first duty of a theory is to *account for* or *explain* observed phenomena. But a theory ought to do more than that. A theory also ought to make predictions about what would occur under specific conditions. Let's look at three examples: one familiar, the other two perhaps less so. In the early part of the 19th century, scientists were already aware of the presence of microorganisms in the air and water, and they had an idea about the connection between the organisms and disease. However, they had no idea of how they came into existence; indeed, belief in the spontaneous generation of these organisms was widespread. Disease was thought to be caused by "bad air." Careful experimentation by Louis Pasteur and other scientists demonstrated that microbes, though carried by air, are not created by air. Living organisms come from other living organisms. These discoveries led to the development of the *germ theory of disease,* which proposed that disease was caused by microorganisms. The acceptance of this theory had obvious important applications in public health, such as the development of vaccines, hygienic practices in surgery, and the pasteurization of milk. It not only could *explain* the presence and spread of disease, it could also *predict,* for example, that doctors who delivered babies without washing their hands after performing autopsies on patients who had died from childbirth fever would transmit the disease to new patients. Even more important, the same theory could be used to *connect* phenomena that, on the surface, appeared unrelated, such as the transmittal of disease, fermentation processes in wine and beer production, and a decline in silkworm production.

Now let's take an example from psychology. It is an observed phenomenon that some people read and comprehend written text faster and better than others. As researchers began to explore this question, a theory of individual differences in working memory evolved. That theory says that people vary in their ability to hold information in what is called working memory (defined, roughly, as that mental processing space in which a person performs computations on information at lightening speed). More specifically, the theory says that people vary in their working memory *capacity*: Some have greater capacity for processing incoming information compared with others, but for everyone, capacity is limited in some way. Initially used to account for individual differences in reading comprehension ability in a person's first language, the theory also accounts for a wide range of seemingly unrelated phenomena, such as why people remember certain sequences of numbers and not others, why they recall certain words that have been heard, why people vary on what parts of sentences they remember best, why certain stimuli are ignored and others attended to, and why some students are good note takers and others are not. A theory of working

memory, then, allows psychologists to unify a variety of behaviors and outcomes that on the surface level do not necessarily appear to be related. There are even attempts to apply the theory of SLA to explain why some people learn faster and better than others.

Let's take a final example, this time from language. In one theory of syntax (sentence structure), a grammar can allow movement of elements in the sentence. This is how we get two sentences that essentially mean the same thing, as in the following:

(1) Mary said what?
(2) What did Mary say?

In this particular theory, the *what* is said to have moved from its position as an object of the verb *said* to occupy a place in a different part of the sentence. At the same time, this theory also says that when something moves, it leaves a hidden *trace*. Thus, the syntactician would write (2) like (3):

(3) What$_i$ did Mary say t_i?

In (3) the *t* stands for the empty spot that the *what* left and the *i* simply shows that the *what* and the *t* are "co-indexed"; that is, if there happens to be more than one thing that moves, you can tell which trace it left behind.

To add to the picture, the theory also says that *t*s, although hidden, are psychologically real and occupy the spot left behind. Thus, nothing can move into that spot and no contractions can occur across it. Armed with this, the syntactician can make a variety of predictions about grammatical and ungrammatical sentences in English. We might predict, for example, that (4) is a good sentence but (5) is bad and not allowed by English grammar:

(4) Should I have done it?
(5) Should I've done it?

The reason for this is that *should* has moved from its original spot and left a *t* behind, as illustrated in (6):

(6) I should have done it. → Should$_i$ I t_i have done it?

At the same time, the syntactician would predict restrictions on the contraction of *want to* to *wanna*. Thus, (7) is fine because there is no trace intervening where a contraction wants to happen:

(7) Who$_i$ do you want to invite t_i to dinner? → Who do you wanna invite to dinner?

All English speakers would agree, however, that (8) is awful:

(8) *Who do you wanna take Susie to the prom next month?

You could probably work this out yourself, but the reason (8) sounds bad is that the *who* has moved and has left behind a *t* that blocks a possible contraction. Compare (7) and (8) redone here as (9) and (10):

(9) Who$_i$ do you want to invite t_i to dinner? → Who do you wanna invite to dinner?
(10) Who$_i$ do you want t_i to take Susie to the prom next month? → *Who do you wanna take Susie to the prom next month?

Be careful not to pronounce *wanna* like *want tuh*; *want tuh* is not a contraction and is merely the schwawing of the vowel sound in *to. Want tuh* sounds OK in sentence (8) precisely because it is not a contraction.

Thus, the theory unifies constraints on contractions with modals (*should, would, will, may, might*), with auxiliaries (*do, have*), with copular verbs (*be*), with the verb *want,* and with pronouns (*I, you, he,* and so on). It makes predictions about good and bad sentences that perhaps we have never seen or heard, some of which—like silkworms and beer—don't seem to have much in common.

To summarize so far, a theory ought to account for and explain observed phenomena and also make predictions about what is possible and what is not. In addition, most theories—good ones, that is—when accounting for and predicting things, also tend to unify a series of generalizations about the world or unify a series of observations about the world. In the brief view we had of syntactic theory, the few generalizations made about how syntax works unify a variety of observations about contractions and not just contractions with *should*. All contractions conform to the generalizations.

For SLA, then, we will want a theory that acts like a theory should. We will want it to account for observable phenomena (something to which we turn our attention later in this chapter). We want it to make predictions. And, ideally, we want it to unify the generalizations we make as part of the theory. In other words, we want a single theory to bring all of the observed phenomena under one umbrella. Whether this is possible at this time has yet to be determined and is something that this book will explore.

What Is a Model?

Many people confuse theories and models. A **model** describes processes or sets of processes of a phenomenon. A model may also show how different components of a phenomenon interact. The important word here is *how.* A model does not need to explain *why.* Whereas a theory can make predictions based on generalizations,

this is not required of a model. The problem is that in the real world—and in SLA as a research discipline—this distinction is not always maintained. You will find as you read further in the field that researchers often use *model* and *theory* interchangeably. Thus, although in principle it would be a good idea to distinguish between these two terms as they do in the natural sciences, in practice many of us in SLA do not do so.

What Is a Hypothesis?

Distinct from a theory, a **hypothesis** does not unify various phenomena; it is usually an idea about a single phenomenon. Some people use theory and hypothesis interchangeably, but in fact, they are distinct and should be kept separate. In science, we would say that a theory can generate hypotheses that can then be tested by experimentation or observation. In psychology, for example, there are theories regarding memory. You may recall the theory about working memory and capacity discussed earlier. The theory says (among many other things) that working memory is limited in capacity. This means that people can pay attention to only so much information at a given time before working memory is overloaded. The theory also says that there are individual differences in working memory and how people use what they have. Some people have *X* amount of working memory capacity as they attend to incoming information, whereas others have more or less. A hypothesis that falls out of this, then, is that working memory differences among individuals should affect reading comprehension: Those with greater working memory capacity should be faster readers or should comprehend more. This is a testable hypothesis. We ought to add here that the only valuable hypotheses for a theory are those that are testable, meaning some kind of experiment can be run or some kinds of data can be examined to see if the hypothesis holds up. Another example of a hypothesis comes from SLA: the Critical Period Hypothesis. This is a theory in neurolinguistics that states that at an early age, the brain begins to specialize; specific brain functions become increasingly associated with specific areas of the brain. In addition, some functions may be developmentally controlled; that is, they turn on and, more important for language learning, turn off at specific points in development. The Critical Period Hypothesis is a direct consequence of this theory. It states that the ability to attain native-like proficiency in a language is related to the initial age of exposure. If language learning begins after a certain age (and there is a considerable controversy over what this age is as well as whether there even is a critical period—see the various papers in Birdsong, 1999), the learners will never reach a level of proficiency or competence comparable to a native speaker's. A corollary to this hypothesis is that language learning ability declines with age after this point. Again, both of these are testable hypotheses. Recall that earlier we said we wanted a theory to make predictions. Predictions are actually hypotheses. When we make a prediction based on a theory, we are in effect making a hypothesis.

These definitions about theories, models, and hypotheses are important because in everyday speech, we may use the term *theory* in a way not intended in science. For example, one might hear in a disparaging tone that something is "just a theory." In science, the phrase "just a theory" makes no sense, as all work is theoretically driven. What is more, the term *theory* has often been politicized to denigrate particular theories (e.g., evolution) so that "just a theory" becomes a way of dismissing something that has scientific rigor but runs against some other set of beliefs. Finally, in movies and other nonscientific situations, one often hears the term *theory* used to mean "an idea" or a "hypothesis." A detective trying to solve a crime might say, "I have a theory about the killer," when that detective means, "I have an idea about the killer." We cannot, of course, rid everyday speech of how it uses certain words. Our point in bringing up the everyday use of *theory* is to make sure that the reader understands the term as it is used in this book.

Constructs

All theories have what are called **constructs**. Constructs are key features or mechanisms on which the theory relies; they must be definable in the theory. In the theory about disease transmission, *germ* is a construct. In the theory about working memory, *capacity* is a construct; and in the theory about syntax, a *trace* is a construct.

In evaluating any theory, it is important to understand the constructs on which the theory relies; otherwise, it is easy to judge a theory one way or another—that is, as a good or bad theory—without a full understanding of the underpinnings of the theory. For example, without an understanding of the construct *germ,* it would have been easy to dismiss germ theory. But given that the construct *germ* was easily definable and identifiable, dismissal of germ transmission and diseases was not so facile. To fully understand something like Relativity, one must have a thorough grasp of the constructs *time, space,* and others.

In SLA, we find an abundance of constructs that are in need of definitions. For example, take the term *second language acquisition* itself. Each word is actually a construct, and you can ask yourself, "What does *second* mean?" "What does *language* mean?" and "How do we define *acquisition*?" In SLA theorizing, most people use the term *second* to mean any language other than one's first language. It makes no difference what the language is, where it is learned, or how it is learned. This suggests, then, that any theorizing about SLA ought to apply equally to the person learning Egyptian Arabic in Cairo without the benefit of instruction as to the person learning French in a foreign language classroom in the United States. By defining *second* in an all-encompassing way, it has an effect on the scope of the theory. If the construct *second* were not defined this way, then it would have limited scope over the contexts of language learning. For example, some people define *second* language to refer to a language learned where it is spoken (e.g., immigrants learning English in this country, an American learning Japanese in Osaka), whereas *foreign* is used to refer to situations in which the language is not

spoken outside of the classroom (e.g., German in San Diego, California). Thus, if *second* were defined in the more restricted way, a theory of SLA would be limited to the first context of learning.

The term *language* is deceptively simple as a construct, but have you ever tried to define it? Does it mean speech? Or does it mean the rules that govern speech production? Or does it mean the unconscious knowledge system that contains all the information about language (e.g., the sound system, the mental dictionary, syntactic constraints, rules on word formation, rules on use of language in context)? Thus, any theory about SLA needs to be clear on what it means by *language*. Otherwise, the reader may not fully grasp what the theory claims, or worse, misinterpret it.

In summary, here are key issues discussed so far:

- Theories ought to explain observable phenomena.
- Theories ought to unify explanations of various phenomena where possible.
- Theories are used to generate hypotheses that can be tested empirically.
- Theories may be explanations of a *thing* (such as language) or explanations of *how* something comes to be (such as the acquisition of language).
- Theories have constructs, which in turn are defined in the theory.

Why Are Theories and Models Either Good or Necessary for SLA Research?

We have explored what theories are but only obliquely addressed why they might be useful. Certainly, they help us to understand the phenomena that we observe. Consider again the Critical Period Hypothesis. It has often been observed that speakers who begin the process of SLA later in life usually have an accent. A theory about the loss of brain plasticity during natural maturation may help explain this phenomenon. The same theory might predict that learners who begin foreign language study in high school will be less likely to approach a native-like standard of pronunciation than those learners who have access to significant amounts of target-language input much earlier in life. These kinds of predictions have clear practical applications; for example, they suggest that foreign language learning should begin at a young age.

Let's look at another concrete example. In one theory of SLA, producing language (usually called *output*) is considered an important element in structuring linguistic knowledge and anchoring it in memory. In another theory, in contrast, output is considered unimportant in developing second language knowledge. Its role is limited to building control over knowledge that has already been acquired. These differences in theory would have clear and important consequences for second language instruction. In the first case, output practice would have a significant role in all aspects of instruction. In the second case, it would be most prominent in fluency practice.

So far we have explored the utility of theories from a practical, real-world perspective. Theories are also useful in guiding research, which may not always have immediate practical purposes related to, say, instruction. If we step back for a moment and consider the theories previously mentioned, we have looked at the following:

1. a theory that explains/predicts constraints on contraction in English
2. a theory that explains/predicts foreign accents in adult learners
3. theories that predict the role of output in the second language acquisition process

You may notice that they are not all the same. The first is a theory of *what* is to be acquired, that is, the unconscious mental representation of constraints on language. It is not enough to say, for example, that learners are acquiring English, for this begs the question, "What is English? How is it different from Spanish or Chinese?" Clearly, a dictionary of the English language is not the language itself, and so memorizing a dictionary is not equivalent to acquiring English. Nor would it be sufficient to study a big grammar book and commit all its rules to memory. It is very unlikely that any grammar book includes the *wanna/'ve* rule that appeared earlier in this chapter, for example. And what about the sound system and constraints on syllable formation (e.g., no syllable in English can start with the cluster *ru,* but such a syllable-initial cluster is possible in French)? In short, English, like any other language, is complex and consists of many components. You may recall that we touched on this issue when we noted that *language* itself is a construct that a theory needs to define. Once the theory defines what it means by *language,* it can better guide the questions needed to conduct research.

The second two items on the preceding list are not really about the target of acquisition; rather, they address the factors that affect learning outcomes (e.g., the Critical Period position) or they address *how* learning takes place, in other words, processes learners must undergo. These processes may be internal to the learner (such as what might be happening in working memory as the learner is attempting to comprehend language and how this impacts learning) or they may be external to the learner (such as how learners and native speakers engage in conversation and how this impacts learning). Theories regarding factors or processes are clearly different from theories about the *what* of acquisition, but they, too, can guide researchers conducting empirical research.

Finally, research can return the favor to theorists by evaluating competing theories. For example, one theory of learning, including language learning, maintains that humans are sensitive to the frequency of events and experiences and that this sensitivity shapes their learning. Within this theory, linguistic elements are abstracted from exposure to language and from language use. What look like rules in a learner's grammar are really just the result of repeated exposure to regularities in the input. A competing theory maintains that language learning takes place

largely by the interaction of innate knowledge (i.e., human-specific and universal linguistic knowledge) and data gathered from the input. Within this theory, frequency may have some role in making some aspects of language more "robust," but it is not a causal factor as it is in the first theory. Each of these two theories can generate predictions, or hypotheses, about how language acquisition will take place under specific conditions. These hypotheses can then be tested against observations and the findings of empirical studies.

What Needs to Be Explained by Theories in SLA?

As we mentioned at the outset of this chapter, one of the roles of theories is to explain observed phenomena. Examples we gave from the sciences were the observation that the Earth revolves around the sun and doesn't fly off into space and that humans are bipedal while our closest relatives are knuckle-walkers. Theories in science attempt to explain these observations, that is, tell *why* they exist.

In the field of SLA research, a number of observations have been cataloged (e.g., Long, 1990), and what follows is a condensed list of them. At the end of the chapter are references for more detailed accounts of these observations.

Observation 1: Exposure to input is necessary for SLA. This observation means that acquisition will not happen for learners of a second language unless they are exposed to input. Input is defined as language the learner hears (or reads) and attends to for its meaning. For example, when a learner hears "Open your books to page 24" in a second language, the learner is expected to comprehend the message and open his or her book to page 24. Language the learner does not respond to for its meaning (such as language used in a mechanical drill) is not input. Although everyone agrees that input is necessary for SLA, not everyone agrees that it is sufficient.

Observation 2: A good deal of SLA happens incidentally. This captures the observation that various aspects of language enter learners' minds/brains when they are focused on communicative interaction (including reading). In other words, with incidental acquisition, the learner's *primary* focus of attention is on the message contained in the input, and linguistic features are "picked up" in the process. Incidental acquisition can occur with any aspect of language (e.g., vocabulary, syntax, morphology [inflections], phonology).

Observation 3: Learners come to know more than what they have been exposed to in the input. Captured here is the idea that learners attain unconscious knowledge about the L2 that could not come from the input alone. For example, learners come to know what is ungrammatical in a language, such as the constraints on *wanna* contraction that we saw earlier in this chapter. These constraints are not taught and are not evident in the samples of language learners hear. Another kind of unconscious knowledge that learners attain involves ambiguity. Learners come to know, for example, that the sentence *John told Fred that he was going to sing* can mean that either John will sing or Fred will sing.

Observation 4: Learners' output (speech) often follows predictable paths with predictable stages in the acquisition of a given structure. Learners' speech shows evidence of what are called "developmental sequences." One example involves the acquisition of negation in English. Learners from all language backgrounds show evidence of the following stages:

Stage 1: *no* + phrase: *No want that.*
Stage 2: subject + *no* + phrase: *He no want that.*
Stage 3: *don't, can't, not* may alternate with *no: He can't/don't/not want that.*
Stage 4: Negation is attached to modal verbs: *He can't do that.*
Stage 5: Negation is attached to auxiliaries: *He doesn't want that.*

In addition to developmental sequences, there are such things as "acquisition orders" for various inflections and small words. For example, in English, *-ing* is mastered before regular past tense, which is mastered before irregular past tense forms, which in turn are mastered before third-person (present tense) *-s.* These stages of development also capture the observation that learners may pass through "U-shaped" development. In such a case, the learner starts out doing something correctly then subsequently does it incorrectly and then "reacquires" the correct form. A classic example comes from the irregular past tense in which learners begin with *came, went* (and similar forms), then may begin to produce *camed, goed/wented,* and then later produce the correct *went, came* and other irregular forms.

Observation 5: Second language learning is variable in its outcome. Here we mean that not all learners achieve the same degree of unconscious knowledge about a second language. They may also vary on speaking ability, comprehension, and a variety of other aspects of language knowledge and use. This may happen even under the same conditions of exposure. Learners under the same conditions may be at different stages of developmental sequences or be further along than others in acquisition orders. What is more, it is a given that most learners do not achieve native-like ability in a second language.

Observation 6: Second language learning is variable across linguistic subsystems. Language is made up of a number of components that interact in different ways. For example, there is the sound system (including rules on what sound combinations are possible and impossible as well as rules on pronunciation), the lexicon (the mental dictionary along with word-specific information such as verb "X" cannot take a direct object or it requires a prepositional phrase or it can only become a noun by addition of *-tion* and not *-ment,* for example), syntax (what are possible and impossible sentences), pragmatics (knowledge of what a speaker's intent is, say, a request versus an actual question), and others. Learners may vary in whether the syntax is more developed compared with the sound system, for example.

Observation 7: There are limits on the effects of frequency on SLA. It has long been held that frequency of occurrence of a linguistic feature in the input correlates with whether it is acquired early or late, for example. However, frequency is not

an absolute predictor of when a feature is acquired. In some cases, something very frequent takes longer to acquire than something less frequent.

Observation 8: There are limits on the effect of a learner's first language on SLA. Evidence of the effects of the first language on SLA has been around since the beginning of contemporary SLA research (i.e., the early 1970s). It is clear, however, that the first language does not have massive effects on either processes or outcomes, as once thought. (We will review one particular theory in Chapter 2.) Instead, it seems that the influence of the first language is somehow selective and also varies across individual learners.

Observation 9: There are limits on the effects of instruction on SLA. Teachers and learners of languages often believe that what is taught and practiced is what gets learned. The research on instructed SLA says otherwise. First, instruction sometimes has no effect on acquisition. As one example, instruction has not been shown to cause learners to skip developmental sequences or to alter acquisition orders. Second, some research has shown that instruction is detrimental and can slow down acquisition processes by causing stagnation at a given stage. On the other hand, there is also evidence that in the end, instruction may affect how fast learners progress through sequences and acquisition orders and possibly how far they get in those sequences and orders. Thus, there appear to be beneficial effects from instruction, but they are not direct and not what many people think.

Observation 10: There are limits on the effects of output (learner production) on language acquisition. Although it may seem like common sense that "practice makes perfect," this adage is not entirely true when it comes to SLA. There is evidence that having learners produce language has an effect on acquisition, and there is evidence that it does not. What seems to be at issue, then, is that whatever role learner production (i.e., using language to speak or write) plays in acquisition, there are constraints on that role, as there on other factors, as noted earlier.

Again, the role of a theory is to explain these phenomena. It is not enough for a theory to say they exist or to predict them; it also has to provide an underlying explanation for them. For example, natural orders and stages exist. But why do they exist and why do they exist in the form they do? Why do the stages of negation look the way they do? As another example, why is instruction limited? What is it about language acquisition that puts constraints on it? Why can't stages of acquisition be skipped if instruction is provided for a structure? And if instruction can speed up processes, why can it?

As you read through the various theories in this volume, you will see that current theories in SLA may explain close to all, some, or only a few of the phenomena. What is more, the theories will differ in their explanations as they rely on different premises and different constructs.

The Explicit/Implicit Debate

Of concern and considerable controversy in the field of SLA are the roles of explicit and implicit learning and knowledge. These concepts are notoriously

difficult to define, in part because they rest on constructs such as consciousness and awareness, which themselves have been the subject of extended scholarly debate.

Hulstijn (2005) defines the distinction in learning as follows:

> Explicit learning is input processing with the conscious intention to find out whether the input information contains regularities and, if so, to work out the concepts and rules with which these regularities can be captured. Implicit learning is input processing without such an intention, taking place unconsciously. (p. 131)

Hulstijn's definition of explicit learning appears to include both awareness of what is to be learned and the intention to learn it. Not all researchers agree. DeKeyser (2003) counts only the former as a hallmark of explicit learning and its absence as a defining feature of implicit learning, which he calls "learning without awareness of what is being learned" (p. 314). Elsewhere, Hulstijn (2003) also provides a more fine-grained distinction, noting that whereas explicit learning involves awareness at the point of learning, intentional learning additionally involves a "deliberate attempt to commit new information to memory" (p. 360). Ellis (2009a) offers a definition of explicit learning that includes intentionality, demands on attentional resources, and awareness of what is being learned and a definition of implicit learning as learning that takes place when all of these features are absent.

What is important to note about all of these definitions is the absence of instruction; that is, they present explicit/implicit learning from the viewpoint of what the learner thinks and does, not from the perspective of what the environment is doing to the learner. Thus, the issue that confronts us here is not the role of instruction (that is handled by Observation 9). Instead, the focus is on what is going on in the mind/brain of the learner when that learner is exposed to L2 input (with or without instruction). Thus, the reader is cautioned not to confuse explicit/implicit learning with explicit/implicit teaching.

As we mentioned, the relative roles (or contributions) of explicit and implicit learning are debated in SLA. Does SLA fully or largely involve explicit learning? Does it fully or largely involve implicit learning? Or does SLA somehow engage both explicit and implicit learning, and if so, how, under what conditions, and for what aspects of language? On one hand, some scholars have questioned whether learning without awareness is even possible. On the other hand, others have questioned whether explicit learning can ever provide the basis for spontaneous and automatic retrieval of knowledge.

Indeed, embedded within these questions about learning is the distinction between explicit and implicit knowledge. Ellis (2009b) asserts both a behavioral and neurobiological basis for this distinction. For the first, he offers "the well-attested fact that speakers of a language may be able to use a linguistic feature accurately and fluently without any awareness of what the feature consists of and vice versa" (p. 335), and for the second, "whereas implicit knowledge involves

widely divergent and diffuse neural structures . . . explicit knowledge is localized in more specific areas of the brain" (p. 335). Implicit and explicit learning and knowledge are clearly related yet distinct concepts (Schmidt, 1994). Ellis (2009a) connects them by referring to the resulting representations of the two types of learning. Specifically, he claims that implicit learning leads to subsymbolic knowledge representations, whereas explicit learning results in symbolic representations, allowing learners to verbalize what they have learned.

Regardless of the how one defines the two types of knowledge, the major question that has challenged researchers is the nature of any interface between them. Although most scholars agree that implicit knowledge is the goal of acquisition, how does implicit knowledge develop? Can explicit knowledge become implicit? Does explicit knowledge somehow aid the acquisition of implicit knowledge? Or are they completely separate systems, which, under most conditions of SLA, do not interact?

Because the field has not yet arrived at a consensus on these questions, and because there is conflicting evidence on the relative roles of explicit and implicit learning, we cannot offer an observation like those that have preceded this section. Therefore, we are asking the contributors to this volume to address explicit and implicit learning and knowledge in a special section in each chapter, asking them to discuss what each theory or framework would claim about the two types of learning and the development of the two types of knowledge.

About This Volume

In this volume, we have asked some of the foremost proponents of particular theories and models to describe and discuss them in an accessible manner to the beginning student of SLA theory and research. As they do so, the various authors address particular topics and questions so that the reader may compare and contrast theories more easily:

- The Theory and Its Constructs
- What Counts as Evidence for the Theory
- Common Misunderstandings
- An Exemplary Study
- How the Theory Addresses the Observable Phenomena of SLA
- The Explicit/Implicit Debate

Our own interests and areas of expertise have led us to the linguistic and cognitive aspects of SLA. Thus, the theories and perspectives taken in the present volume—for the most part—reflect such orientations. To be sure, there are social perspectives that can be brought to bear on SLA (see Atkinson, 2011; Block, 2003). These perspectives are often offered as "alternatives" to the linguistic and cognitive orientations that are said to dominate L2 research, but in our view, they

are simply looking at different phenomena (see, e.g., the discussion in Rothman & VanPatten, 2013). In excluding such perspectives from the present volume, we do not suggest that they are unimportant for the field of SLA research as a whole. Instead, our intention is to gather those approaches that currently compete to explain the acquisition of a linguistic system (with primary emphasis on syntax, morphology, and, to a lesser degree, the lexicon). For those who seek socially oriented frameworks used in L2 research, we suggest using something like Atkinson's (2011) edited volume (or parts of it) as an accompaniment to the present volume.

Discussion Questions

1. In what ways do theories affect our everyday lives? Try to list and discuss examples from politics, education, and society.
2. Discuss a theory from the past that has been disproved. Also discuss a theory from the past that has stood the test of time. Do you notice any differences between these theories in terms of their structures? Is one simpler than the other? Does one rely on nonnatural constructs for explanation?
3. Theories are clearly useful in scientific ventures and may have practical applications. They have also become useful, if not necessary, in the behavioral and social sciences. In what way is the study of SLA a scientific venture rather than, say, a humanistic one?
4. Reexamine the list of observable phenomena. Are you familiar with all of them and the empirical research behind them? You may wish to consult some basic texts on this topic listed in the "Suggested Further Reading" section (e.g., Ellis, Gass, Long).
5. Is there an observable phenomenon in particular you would like to see explained? Select one and, during the course of the readings, keep track of how each theory accounts for this phenomenon.

Suggested Further Reading

Atkinson, D. (Ed.). (2011). *Alternative approaches to second language acquisition*. New York, NY: Routledge.

This volume presents six approaches to SLA that complement or contrast with cognitive approaches to the field. Two of the approaches are represented in this volume.

Ellis, R. (2008). *The study of second language acquisition* (2nd ed.). Oxford, England: Oxford University Press.

This volume is a comprehensive overview of the field that continues to be an excellent resource on many topics in the field.

Gass, S. (2013). *Second language acquisition: An introductory course* (4th ed.). New York, NY: Routledge.

This is a basic introduction to the field in a form that is accessible to readers new to the field. It includes authentic data-based problems at the end of each chapter that help readers grapple with issues typical of SLA research.

Hustijn, J. (2005). Theoretical and empirical issues in the study of implicit and explicit second language learning. *Studies in Second Language Acquisition, 27,* 129–140.
This article is the introduction to a special issue on implicit and explicit learning and knowledge in SLA. As such, it provides a good overview of the issues on this topic.

Lightbown, P., & Spada, N. (2013). *How languages are learned* (4th ed.). Oxford, England: Oxford University Press.
This volume is aimed at teachers and focuses on language acquisition in classroom settings.

Long, M. H. (1990). The least a second language acquisition theory needs to explain. *TESOL Quarterly, 24,* 649–666.
The observations listed in this chapter are based, in part, on this seminal article.

Rothman, J., & VanPatten, B. (2013). On multiplicity and mutual exclusivity: The case for different theories. In M. P. García Mayo, M. J. Gutierrez-Mangado, & M. Martínez Adrián (Eds.), *Contemporary approaches to second language acquisition* (pp. 243–256). Amsterdam, Netherlands: John Benjamins.
This chapter, while taking a generative perspective on language, argues that different theories exist because of the complexity of acquisition, suggesting that multiple theories may be necessary to understand acquisition in its entirety.

VanPatten, B. (2003). *From input to output: A teacher's guide to second language acquisition*. New York, NY: McGraw-Hill.
This is an introductory volume for teachers with little background in SLA. It focuses on how input data are processed, what the linguistic system looks like and how it changes, and how learners acquire the ability to produce language, among other aspects of acquisition.

References

Atkinson, D. (Ed.). (2011). *Alternative approaches to second language acquisition.* New York, NY: Routledge.

Birdsong, D. (Ed.). (1999). *Second language acquisition and the critical period hypothesis.* Mahwah, NJ: Lawrence Erlbaum Associates.

Block, D. (2003). *The social turn in second language acquisition.* Edinburgh, Scotland: Edinburgh University Press.

DeKeyser, R. (2003). Implicit and explicit learning. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp. 313–348). Cambridge, England: Cambridge University Press.

Ellis, R. (2009a). Implicit and explicit learning, knowledge and instruction. In R. Ellis, S. Loewen, C. Elder, R. Erlam, J. Philp, & H. Reinders (Eds.), *Implicit and explicit knowledge in second language learning, testing and teaching* (pp. 3–25). Bristol, England: Multilingual Matters.

Ellis, R. (2009b). Retrospect and prospect. In R. Ellis, S. Loewen, C. Elder, R. Erlam, J. Philp, & H. Reinders (Eds.), *Implicit and explicit knowledge in second language learning, testing and teaching* (pp. 335–353). Bristol, England: Multilingual Matters.

Hulstijn, J. (2003). Incidental and intentional learning. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp. 349–381). Cambridge, England: Cambridge University Press.

Hulstijn, J. (2005). Theoretical and empirical issues in the study of implicit and explicit second language learning. *Studies in Second Language Learning, 27,* 129–140.

Kuhn, T. S. (1996). *The structure of scientific revolutions* (3rd ed.). Chicago, IL: University of Chicago Press.

Rothman, J., & VanPatten, B. (2013). On multiplicity and mutual exclusivity: The case for different theories. In M. P. García Mayo, M. J. Gutierrez-Mangado, & M. Martínez Adrián (Eds.), *Contemporary approaches to second language acquisition* (pp. 243–256). Amsterdam, Netherlands: John Benjamins.

Schmidt, R. (1994). Deconstructing consciousness: In search of useful definitions for applied linguistics. *AILA Review, 11,* 129–158.