

Learning Strategies in Second Language Acquisition

**J. Michael O'Malley
Anna Uhl Chamot**

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Learning Strategies in Second Language Acquisition

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Series editors' preface

Second language teaching in recent years has moved away from the quest for the perfect teaching method, focusing instead on how successful teachers and learners actually achieve their goals. In the case of teachers, this has led to classroom-centered research on the linguistic, discoursal, and interactional structure of teaching events. In the case of learners, it has led to the study of (1) how learners approach learning, both in and out of classrooms, and (2) the kinds of strategies and cognitive processing they use in second language acquisition.

This latter perspective – learning strategies – is the subject of this important book. J. Michael O'Malley and Anna Uhl Chamot survey the role of cognitive processes in second language learning, reviewing the literature on cognitive processes and language learning, and reporting on large-scale empirical investigations of their own. In the process, the authors offer a highly readable account of the nature and significance of learning strategies, and demonstrate how the research findings on learner strategies can be used as a basis for planning more effective instructional practices. This new title in the Cambridge Applied Linguistics Series hence adds another dimension to what we know about second language acquisition. It also shows how the field of second language teaching can benefit from a greater consideration of the role of cognitive strategies in both the comprehension and learning of second and foreign languages.

Michael H. Long
Jack C. Richards

Preface

In writing this book, we have had a number of goals in mind. Our primary goal is to respond to a need for information on how instruction in second language acquisition can be integrated with recent knowledge from cognitive theory and research on learning strategies. A second goal is to address the need for a synthesis of research and theory in cognition with research and current views of second language acquisition. And a third goal is to respond to the need among second language teachers for guidance on how to present instruction that capitalizes on the knowledge and skills students bring to classrooms and encourages the development of new and more effective strategies for learning.

We have sensed a strong division between linguistic theory and cognitive psychology that originates in part in differing aims and methods but is also related to the rejection of behaviorism by linguists. Whereas cognitive psychology also rejected behaviorism, it has been influenced heavily by linguistics. However, the communication has not occurred in both directions. Very few ideas from cognitive psychology appear to have been adopted in second language acquisition research and theory. As much as the original schism between behaviorism and linguistics may have been necessary, we would like to contribute toward bridging the gap and show how recent thinking in cognitive psychology can be useful for applications in second language acquisition.

We have also sensed that deliberate cognitive processing is ignored, if not disparaged, under prevailing views in second language instruction. The rationale seems to be that true “acquisition” of a second language is said to occur without awareness, that conscious mediation is thought to slow processes that otherwise might occur automatically, and that acquisition in classrooms occurs most effectively when teachers concentrate on making input comprehensible. We wish to show that this notion is only partially accurate, tends to be misleading as stated, and leads to inappropriate consequences for instruction, such as the limited view that a teacher’s primary role is to provide comprehensible input. We would prefer to replace it with the view that language learning involves many conscious decisions at

both the cognitive and metacognitive levels, which parallel cognitive processes in learning other complex cognitive skills. We would like to see more individuals adopt the view that teachers can encourage and assist students in using effective strategies for learning and can extend and challenge the student's mastery of the language by introducing academic language embedded in substantive content.

Finally, we have sensed that instructional approaches in second language acquisition are rarely based on sound theory and research on how individuals learn. We wish to encourage stronger linkages between theory and practice by illustrating how an instructional model can originate in theory and research and move toward classroom practices that are useful, understandable, and effective for teachers and for students.

This book builds on our previous work on an instructional approach for students with limited English proficiency. The approach is based on cognitive theory and integrates academic language development, content area instruction, and instruction in the application of learning strategies to facilitate the acquisition of both content and language. The approach is referred to as the Cognitive Academic Language Learning Approach (CALLA) and is introduced here in Chapter 6. This book examines the linkages among theory, research, and practice underlying CALLA more closely than in our previous work, which tended to isolate theory, research, or practice in separate publications. The instructional materials we have already published in social studies and mathematics use content-based ESL in a communication-based approach that incorporates learning strategies, academic language development, cooperative learning, and other principles that are characteristic of CALLA. The present book has helped us clarify the thinking underlying both the CALLA model and the development of materials; we believe it will lead to further refinements in our attempts to develop future research and to expand upon and implement the instructional approach.

The intended audience for this book includes applied linguists, educational researchers, teacher trainers, course designers, and language teachers who wish to apply research findings on learning strategies in second language acquisition to their classrooms and help students become more effective and independent learners. These individuals may have interests in English as a second language, bilingual education, or foreign language instruction. Those with interests in second language acquisition in general may include academic researchers or professors, current teachers, teachers-in-training, and curriculum designers. The book may find use in undergraduate and graduate programs, in in-service training programs, or as a text or reference in courses on research and theory. We would be particularly pleased if the book were used by

graduate students interested in selecting a topic for dissertation research in any of these areas.

We have had the opportunity to describe many of the ideas presented in this book at teacher training workshops, in university in-service training courses, and at professional conferences. We wish to acknowledge all of the teachers, teacher trainers, researchers, and other individuals who participated in those activities for challenging us to refine our thinking and to express the concepts with greater clarity. We have also had the opportunity to publish some of the research, theory, and instructional applications in professional journals and have profited greatly from comments by anonymous reviewers. We wish to acknowledge the contributions of Carol Walker of the Catholic University of America, who was co-author on one of these publications, is responsible for introducing us to John Anderson's work, and wrote portions of a government report from which we extrapolated pieces contained in Chapter 2. We are also thankful for the contributions of our other co-authors and fellow researchers on some of those studies, including Maria Impink-Hernandez, Lisa Küpper, Rocco Russo, and Gloria Stewner-Manzanares. We especially wish to express our gratitude for the support of Jack Richards and Michael Long, the editors of the Cambridge Applied Linguistic Series, for comments by Barry McLaughlin of the University of California at Santa Cruz, and for the continuing support and encouragement offered by Ellen Shaw, ESL editor at Cambridge University Press. The book is a finer product for all that they have contributed.

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Last, but most important, we each wish to express our appreciation for the support provided by our respective families throughout the writing of this book. That support is the key to maintaining a balance between professional and family involvement, which enabled this work to be completed.

1 *Introduction*

This book is concerned with “learning strategies,” the special thoughts or behaviors that individuals use to help them comprehend, learn, or retain new information. It focuses on the application of learning strategies to second language acquisition by students learning English as a second language as well as by students learning foreign languages. The book addresses the need for an integrated treatment of learning strategies in second language acquisition that is based on theory and research. The theory used here describes how second languages are learned and what role learning strategies play in the language acquisition process. The theory is also used to organize the presentation of research results, examine the findings, and integrate the results with other studies.

The research and theory described in this book are based on a cognitive information processing view of human thought and action. Two fundamental principles underlying this theory are: (a) that behavior can best be explained by reference to how individuals perceive and interpret their experiences, and (b) that the way in which individuals think and reason has parallels with the manner in which computers process information (Shuell 1986). In cognitive theory, individuals are said to “process” information, and the thoughts involved in this cognitive activity are referred to as “mental processes.” Learning strategies are special ways of processing information that enhance comprehension, learning, or retention of the information.

This volume presents the view that language is a complex cognitive skill that can be described within the context of cognitive theory. A theory of second language acquisition, to be successful, must be able to describe how knowledge about language is stored in memory and how the process of second language acquisition ultimately results in automatic language comprehension and production. In addition, to be credible, the theory must explain a wide variety of language constructs that have been discussed in the first and second language acquisition literature. For our purposes, we add the further constraint that the theory be able to describe what learning strategies are, how information about learning strategies is stored in memory, how strat-

egies are learned and may become automatic, and why they influence learning in a positive manner.

At the onset of our research on learning strategies in 1981, there was no theory to guide our studies and few empirical investigations into the nature of learning strategies and their influence on second language acquisition. What did exist were a few descriptive studies of strategies used by effective second language learners and, quite significantly, over ten years of extensive research in psychology on the influence of learning strategies on reading comprehension and problem solving. The two bodies of research, one in second language acquisition and the other in cognitive psychology, had proceeded fully independent of each other with little cross-referencing of concepts and approaches across topic areas. Furthermore, the methodologies in the studies were different, the ones in second language acquisition being descriptive, and the ones in psychology being experimental and oriented toward training learners to acquire strategies. What these bodies of research had in common was an interest in the mental processes of experts compared with novices, and an undeniable paucity of theory to describe what strategies were or how they influenced learning. The lack of theory to explain learning strategies was compounded in second language acquisition studies by the lack of a comprehensive theory to explain how individuals learn the structures and functions associated with second language use. Only recently have papers appeared in which learning strategies are integrated within cognitive theory (e.g., Rabinowitz and Chi 1987; Garner 1986; Mayer 1988), but when we began our research there was a vacuum with respect to the integration of strategic processing in theories of second language acquisition. We hope to address and at least partially resolve this issue in the later chapters.

The notion that special learner techniques or strategies might assist second language acquisition is actually quite new, having emerged in the research literature just over ten years ago. The suggestion that the "good language learner" might be doing something special or different that we could all learn from was introduced at about the same time in work by Rubin (1975) and by Stern (1975). This notion contrasts sharply with the idea that some people just have an "ear" for language or that some individuals have an inherent ability for language learning. This early work anticipated what cognitive psychologists were realizing independently, that competent individuals are effective because of special ways of processing information. There was also the suggestion that these strategies are not the preserve of highly capable individuals, but could be learned by others who had not discovered them on their own.

Background

In this section we introduce some of the early studies on learning strategies in second language acquisition and cognitive psychology in order to establish a framework for describing the research presented in later chapters. These studies provided the empirical background for the initial investigations we developed. In later chapters we expand upon this selective review to present a more detailed examination of research and to analyze some of the more recent findings concerning learning strategies, leading up to a detailed description of our own work. This section continues with an introduction to relevant theoretical positions on language competence and second language acquisition that were current when we began our studies. We expand upon this description in far greater detail in subsequent chapters, and indicate implications for instructional practice.

Research on learning strategies

The literature on learning strategies in second language acquisition emerged from a concern for identifying the characteristics of effective learners. Research efforts concentrating on the “good language learner” (Naiman et al. 1978; Rubin 1975) had identified strategies reported by students or observed in language learning situations that appear to contribute to learning. These efforts demonstrated that students do apply learning strategies while learning a second language and that these strategies can be described and classified. For example, Rubin (1981) proposed a classification scheme that subsumes learning strategies under two primary groupings and a number of subgroups, as illustrated in Table 1.1.

Rubin’s first primary category, consisting of strategies that directly affect learning, includes clarification/verification, monitoring, memorization, guessing/inductive reasoning, deductive reasoning, and practice. The second primary category, consisting of strategies that contribute indirectly to learning, includes creating practice opportunities and using production tricks such as communication strategies. Rubin based her strategies on fairly extensive data collection in varied settings, which included about fifty hours of classroom observation, observation of a small group of students working on a strip story, analysis of self-reports from “a few students” instructed to write down what they did to learn a second language, and analysis of daily journal entries of two students who were directed to report on strategies after having been given strategy examples. The classroom observations proved to be the least useful of these methods for identifying strategies.

TABLE 1.1. CLASSIFICATIONS OF LEARNING STRATEGIES IN SECOND LANGUAGE ACQUISITION

<i>Author</i>	<i>Primary strategy classification</i>	<i>Representative secondary strategies</i>	<i>Representative examples</i>
Rubin (1981)	Strategies that directly affect learning	Clarification/verification	Asks for an example of how to use a word or expression, repeats words to confirm understanding
		Monitoring	Corrects errors in own/other's pronunciation, vocabulary, spelling, grammar, style
		Memorization	Takes note of new items, pronounces out loud, finds a mnemonic, writes items repeatedly
		Guessing/inductive inferencing	Guesses meaning from key words, structures, pictures, context, etc.
		Deductive reasoning	Compares native/other language to target language
		Practice	Groups words Looks for rules of co-occurrence Experiments with new sounds Repeats sentences until pronounced easily
	Processes that contribute indirectly to learning	Creates opportunities for practice	Listens carefully and tries to imitate Creates situation with native speaker Initiates conversation with fellow students Spends time in language lab, listening to TV, etc.
		Production tricks	Uses circumlocutions, synonyms, or cognates Uses formulaic interaction Contextualizes to clarify meaning

Naiman et al. (1978)	Active task approach	<p>Responds positively to learning opportunity or seeks and exploits learning environments</p> <p>Adds related language learning activities to regular classroom program</p> <p>Practices</p>	<p>Student acknowledges need for a structured learning environment and takes a course prior to immersing him/herself in target language</p> <p>Reads additional items</p> <p>Listens to tapes</p>
	Realization of language as a system	<p>Analyzes individual problems</p> <p>Makes L1/L2 comparisons</p> <p>Analyzes target language to make inferences</p> <p>Makes use of fact that language is a system</p>	<p>Writes down words to memorize</p> <p>Looks at speakers' mouth and repeats</p> <p>Reads alone to hear sounds</p> <p>Uses cognates</p> <p>Using what is already known</p> <p>Uses rules to generate possibilities</p>
	Realization of language as a means of communication and interaction	<p>Emphasizes fluency over accuracy</p> <p>Seeks communicative situations with L2 speakers</p>	<p>Relates new dictionary words to others in same category</p> <p>Does not hesitate to speak</p> <p>Uses circumlocutions</p> <p>Communicates whenever possible</p> <p>Establishes close personal contact with L2 native speakers</p> <p>Writes to pen pals</p>
	Management of affective demands	<p>Finds sociocultural meanings</p> <p>Copes with affective demands in learning</p>	<p>Memorizes courtesies and phrases</p> <p>Overcomes inhibition to speak</p> <p>Is able to laugh at own mistakes</p> <p>Is prepared for difficulties</p>
	Monitoring L2 performance	<p>Constantly revises L2 system by testing inferences and asking L2 native speakers for feedback</p>	<p>Generates sentences and looks for reactions</p> <p>Looks for ways to improve so as not to repeat mistakes</p>

An alternative classification scheme proposed by Naiman et al. (1978), also shown in Table 1.1, contains five broad categories of learning strategies and a number of secondary categories. The primary strategies were found to be common to all good language learners interviewed, whereas the secondary strategies were represented only in some of the good learners. The primary classification includes an active task approach, realization of language as a system, realization of language as a means of communication and interaction, management of affective demands, and monitoring of second language performance. Naiman et al. based this classification scheme on interviews with thirty-four good language learners and an initial strategy scheme suggested earlier by Stern (1975). Naiman et al. also identified what they referred to as “techniques” for second language learning, which differed from strategies in their scheme by being focused on specific aspects of language learning. The techniques, with selected examples of each, are as follows:

Sound acquisition

repeating aloud after a teacher, a native speaker, or a tape;
listening carefully; and
talking aloud, including role playing.

Grammar

following rules given in texts;
inferring grammar rules from texts;
comparing L1 and L2; and
memorizing structures and using them often.

Vocabulary

making up charts and memorizing them;
learning words in context;
learning words that are associated;
using new words in phrases;
using a dictionary when necessary; and carrying a notebook to note new items.

Listening comprehension

listening to the radio, records, TV, movies, tapes, etc.; and
exposing oneself to different accents and registers.

Learning to talk

not being afraid to make mistakes;
making contact with native speakers;
asking for corrections; and
memorizing dialogues.

Learning to write

having pen pals;
writing frequently; and
frequent reading of what you expect to write.

Learning to read

reading something every day;
reading things that are familiar;

reading texts at the beginner's level; and looking for meaning from context without consulting a dictionary.

Among the various techniques Naiman's group identified, those associated with vocabulary learning were used most frequently. This is significant because it suggests that learners either have difficulty in identifying what techniques they use to learn other tasks or have few strategic processes for doing so. More recently, Oxford (1985) has compiled an extensive list of strategies identified in these studies and in our early studies that will be described in this book (e.g., O'Malley, Chamot, Stewner-Manzanares, Küpper, and Russo 1985a). However, Oxford's approach was not available when we began our work.

As can be seen from an inspection of the strategies in Table 1.1 and from the Naiman group's techniques, a number of highly useful deliberate approaches to learning a second language have been identified. Most of these emerged from interviews or, with Rubin, from interviews and diaries. The Rubin and Naiman et al. classification schemes are substantially different, however, and do not have any grounding in theories of second language acquisition or cognition. Consequently, it is difficult to winnow out from the extensive listing of strategies and techniques which ones are fundamental for learning, which ones might be most useful to other learners, and which should be combined with others to maximize learning effectiveness.

Research on training second language learners to use learning strategies has been limited almost exclusively to applications with vocabulary tasks. Dramatic improvements in vocabulary learning tasks presented in one-on-one training have been reported in these studies. The typical approach in this research has been either to encourage students to develop their own associations for linking a vocabulary word with its equivalent in the second language (Cohen and Aphek 1980, 1981) or to train students to use specific types of linking associations to cue the target word, such as the keyword method (e.g., Atkinson and Raugh 1975; Levin 1981; Pressley et al. 1980; Pressley et al. 1981). The strategy training in these vocabulary studies was given individually or was provided to groups by an experimenter using special audio equipment for each subject. There were no instances in which training in learning strategies in second language acquisition was performed in a natural classroom instructional setting or by the teacher of the students who served as subjects.

In cognitive psychology, studies of learning strategies with first language learners have concentrated on determining the effects of strategy training on different kinds of tasks and learners. Findings from these studies generally indicated that strategy training is effective in improving the performance of students on a wide range of reading comprehension and problem-solving tasks (e.g., Brown et al. 1983; Chipman, Segal,

and Glaser 1985; Dansereau 1985; Segal, Chipman, and Glaser 1985). One of the more important outcomes of these psychological studies was the formulation of learning strategies in an information-processing theoretical model. This model contains an executive, or metacognitive, function in addition to an operative, or cognitive-processing, function. *Metacognitive strategies* involve thinking about the learning process, planning for learning, monitoring of comprehension or production while it is taking place, and self-evaluation after the learning activity has been completed. *Cognitive strategies* are more directly related to individual learning tasks and entail direct manipulation or transformation of the learning materials (Brown and Palincsar 1982). A third type of learning strategy identified in the literature on cognitive psychology concerns the influence of social and affective processes on learning. Examples of *social/affective strategies* are cooperative learning, which involves peer interaction to achieve a common goal in learning (e.g., Dansereau et al. 1983; Slavin 1980), and asking questions for clarification. Affective strategies are represented in the exercise of "self-talk," the redirecting of negative thoughts about one's capability to perform a task with assurances that the task performance is within reach. Cooperative strategies have been shown to enhance learning on a variety of reading comprehension tasks (Dansereau et al. 1983).

Research in metacognitive and cognitive learning strategies suggests that transfer of strategy training to new tasks can be maximized by pairing metacognitive strategies with appropriate cognitive strategies (Brown et al. 1983). Students without metacognitive approaches are essentially learners without direction or opportunity to plan their learning, monitor their progress, or review their accomplishments and future learning directions. As will be seen in later chapters, the issue of transfer is far from being resolved.

Theoretical background in second language acquisition

There has been no comprehensive analysis describing the influence of cognition in second language acquisition. Nevertheless, at the time of our initial investigations, a number of theorists had articulated positions that included a cognitive component in second language processes. Theoretical efforts that can assist in identifying the role of cognition in second language acquisition had emerged in two general areas: the attempt to describe language proficiency or language competence, and the attempt to explain influences on second language acquisition. In each of these areas, cognition had been described and defined but, as will be seen, was not discussed in sufficient detail to delineate the role of cognition or strategic processing in second language acquisition.

Language proficiency has been described by Cummins (1984) in terms

of two continua that concern task difficulty and the context in which language occurs. Difficulty may vary from cognitively undemanding tasks, such as learning definitions or reading road signs, to cognitively demanding tasks, such as reading or making an oral presentation on an academic topic. The context for language use may vary from contexts that are embedded, or enriched with linguistic or paralinguistic cues for meaning, to contexts that are reduced, or absent of such additional cues to meaning. Academic tasks, for example, tend to be cognitively demanding and usually require language in which contextual cues for meaning are reduced. Tasks outside the classroom, on the other hand, are often undemanding cognitively and are characterized by language that either has rich contextual clues or is formulaic and therefore easy to comprehend or produce. The task difficulty dimension, although based on the cognitive demands of the task, has not been used by Cummins to describe the potential role of strategic cognitive processes in enhancing learning or task performance.

The fundamental concept of language competence expressed by Cummins was extended by Tikunoff (1985) in a model intended to elaborate on the description of student functional proficiency in academic settings. To Cummins's (1984) notion of academic language proficiency, Tikunoff added three intersecting concepts: interactional, academic, and participative competence. For example, successful participation in a classroom setting requires that a student: (1) observe classroom social rules of discourse, (2) function at increasingly complex cognitive levels, and (3) be competent in the procedural rules of the class. As Cummins did with language competence, Tikunoff included a cognitive component but did not elaborate on the significance of strategic behavior for enhancing student comprehension or learning.

Other models of language competence also contained cognitive components but left the role of learning strategies ambiguous. Canale and Swain (1980) proposed a theoretical framework in which communicative competence has three major components. The first is grammatical competence, which includes vocabulary and pronunciation as well as grammatical structures and word forms. The second is sociolinguistic competence, which is made up of sociocultural rules for using language appropriately and discourse rules for linking parts of a language text coherently and cohesively. The third component of the Canale and Swain model is strategic competence, which consists of

verbal and non-verbal communication strategies that may be called into action to compensate for breakdowns in communication due to performance variables or to insufficient competence. (p. 30)

In this model, the strategic component refers to communication strategies, which can be differentiated from learning strategies by the intent

of the strategy use. That is, learning strategies have learning as a goal, and communication strategies are directed toward maintaining communication (Tarone 1981).

The second area in which studies have assisted in identifying the role of cognition in second language acquisition was the theoretical efforts to identify important influences on second language acquisition. These efforts varied considerably in their attention to cognitive and strategic processing. One of the theorists who included an articulated cognitive component, Bialystok (1978), identified four categories of learning strategies in her model of second language learning: inferencing, monitoring, formal practicing, and functional practicing. In this model, learning strategies are defined as "optimal means for exploiting available information to improve competence in a second language" (p. 71). The type of strategy used by the learner depends on the type of knowledge required for a given task. Bialystok discussed three types of knowledge: explicit linguistic knowledge, implicit linguistic knowledge, and general knowledge of the world. She hypothesized that inferencing may be used with implicit linguistic knowledge and knowledge of the world. Monitoring, formal practicing (such as verbal drills found in a second language class), and functional practicing (such as completing a transaction at a store) contribute both to explicit and implicit linguistic knowledge. That is, strategies introduced explicitly in a formal setting can contribute to implicit linguistic knowledge and therefore to students' ability to comprehend and produce spontaneous language.

Bialystok's model can be contrasted to Krashen's Monitor Model (1982), which does not allow for contributions of explicit linguistic knowledge (learning) to implicit linguistic knowledge (acquisition). The Monitor Model includes two types of language processes: "acquisition" and "learning." "Acquisition" is described by Krashen as occurring in spontaneous language contexts, is subconscious, and leads to conversational fluency. "Learning," on the other hand, is equated with conscious knowledge of the rules of language derived from formal and traditional instruction in grammar. The "monitor" is a conscious process in which the learner applies grammatical rules to language production (either oral or written), which means that the monitor is a highly deliberate form of processing. In Krashen's view, "learning" does not lead to "acquisition," because the sole function of learning is to act as a monitor or editor of the learner's output. Therefore, the inescapable conclusion of this model is that conscious use of learning strategies will make little contribution to the development of language competence.

A comprehensive effort to integrate linguistic with affective and cognitive components of learning by Wong Fillmore and Swain reserved an important role for learning strategies in the cognitive component (Wong Fillmore 1985; Wong Fillmore and Swain 1984). Learning strategies

were said to be the principal influence on the rate and level of second language acquisition for children, whereas inherent developmental and experiential factors were considered to be primarily responsible for first language acquisition. The types of strategies described by Wong Fillmore (1985) appear to be more global than those usually described in cognitive psychology, and include knowledge and mental skills as well as strategic processes. Wong Fillmore (1985) suggests that strategies include

associative skills, memory, social knowledge, inferential skills... analytical skills... pattern recognition, induction, categorization, generalization, inference, and the like. (p. 37)

Wong Fillmore noted that differences in the rate and level of second language learning are due to the involvement of general cognitive processes, especially those that are important in language learning. In contrast, the consistency of first language acquisition across individuals is purportedly linked to inherent language acquisition mechanisms. The role that the strategies play with regard to the other model components or to mental processes in second language learning was not identified.

Movement toward a more cognitive view of second language acquisition was evident in the information processing approach suggested by McLaughlin, Rossman, and McLeod (1983). The learner is viewed as an active organizer of incoming information, with processing limitations and capabilities. While motivation is considered to be an important element in language learning, the learner's cognitive system is central to processing. The learner is able to store and retrieve information depending on the degree to which the information was processed. Evidence for aspects of the information processing model comes from studies of language processing and memory. One implication of information processing for second language acquisition is that learners actively impose cognitive schemata on incoming data in an effort to organize the information. McLaughlin et al. (1983) drew on cognitive theory in suggesting that learners may achieve automaticity in second language acquisition by using either a top-down approach (or knowledge-governed system), which makes use of internal schemata, or a bottom-up approach (or an input-governed system), which makes use of external input. In either case, cognition is involved, but the degree of cognitive involvement is set by the interaction between the requirements of the task and the knowledge and mental processes used by the learner.

More recently, Spolsky (1985) proposed a model of second language acquisition based on preference rules in which cognitive processes play an important role. In his view, three types of conditions apply to second language learning: necessary conditions, gradient conditions, and typicality conditions. A *necessary condition* is one that is required for learning to occur. Examples of necessary conditions in second language

acquisition are target language input, motivation, and practice opportunities. The *gradient condition* is one in which the more frequently the condition occurs, the more likely learning is to take place. Examples of a gradient condition might be the greater or lesser degree to which a learner actively seeks out interactions with native speakers of the target language, or the greater or lesser degree to which a learner can fine tune a learning strategy to a specific task. The third type of condition is one that typically, but not necessarily, assists learning. An example of a *typicality condition* might be that of risk taking; thus, outgoing personalities tend to be good language learners as a rule, although in some cases quiet and reflective persons can be equally or more effective learners (Saville-Troike 1984).

Spolsky's model of second language acquisition contains two clusters of interrelated conditions representing these three types. The first cluster contains social context conditions, such as the learning setting and opportunities. The second cluster consists of learner factors, such as capability, prior knowledge, and motivation. The learner makes use of these latter conditions to interact with the social context of learning, and this interaction leads to the amount of language learning that takes place. Thus, this model accounts for variability in second language learning outcomes through differing degrees of (or preferences for) application of gradient and typicality conditions. In Spolsky's model, learning strategies, while not specifically identified as such, would be part of the capabilities and prior learning experiences that the learner brings to the task.

A precise description of the role of strategic processing in second language learning was missing from these theories of second language proficiency and acquisition. Although some of the theories proposed a cognitive component, and some indicated that cognitive processes influence proficiency or the rate and level of acquisition, the manner in which the influence of cognitive processes is exerted with respect to other mental processes or with respect to language tasks had not been described. Further, although information processing theory had been used to classify strategies into metacognitive and cognitive categories, agreement on the assignment of individual strategies to these two broad groupings had been difficult to achieve (Brown et al. 1983), and neither the theory nor the research had been extended to second language acquisition.

There was a need for clarification of the role of learning strategies in second language acquisition from both an empirical and a theoretical standpoint. One step that would help to clarify the definition and assignment of discrete strategies to a classification scheme would be to describe the correspondence between mental processes that have been identified in cognitive theory and strategic processes described in the learning strategies literature. Another step that would help in under-

standing the role of strategic processing in second language acquisition would be to use empirical data from language learners who are asked to describe what they do to assist second language comprehension and learning. This kind of information must be collected using different kinds of data collection procedures and different kinds of language tasks at different stages of second language acquisition. Another step that was needed was the extension of strategy training studies in which the influence of strategy use on language outcomes is determined. In planning the studies that are reported in Chapters 5 and 6, all of these issues, as well as research needs, played a prominent role.

Overview of the book

This background review sets the stage for introducing additional theory and research related to learning strategies and second language acquisition. Chapter 2 of this book presents a theoretical analysis of the role of cognition in learning. It introduces an information processing theory of memory based on the work of selected cognitive researchers, particularly John Anderson. The theory stresses the active nature of mental processes during learning and describes the types of information stored in long-term, as distinguished from short-term, memory. Information in long-term memory consists of declarative knowledge, or the facts we know, and procedural knowledge, or the complex cognitive skills and other processes we know how to perform. Language is stored much like any other complex cognitive skill but, like other procedural information, is learned differently from factual information. As will be seen, this difference has important implications for learning and instruction. We review some potential limitations of the theory and analyze the extent to which they present problems in the second language acquisition area. The cognitive theory is also used to examine language comprehension processes and language production. Finally, the theory is used as the foundation for relating learning strategies to cognitive processes and to show the influence of strategic processing on learning.

In Chapter 3, the review of cognitive theory in second language acquisition presented in Chapter 2 is updated with new research and theory. As will be seen, there has been additional discussion by some of the same theorists, while the views of others have either shifted or have become less important in view of more recent developments. We also analyze new contributions by researchers and theorists whose work was unknown to us earlier. The core of the chapter is our use of the cognitive theory introduced in Chapter 2 to describe many of the phenomena and constructs regularly discussed in the second language literature. One test of the theory is its success in portraying disparate concepts within a

single theoretical framework. We believe that the theory stands up to this integrative test remarkably well considering that it was not intended originally to describe second language acquisition.

Chapter 4 presents descriptive research that is designed to identify and classify learning strategies. The data collection procedures used to identify learning strategies are reviewed, including interviews, observations, questionnaires, and "think-aloud" procedures. We review the rationale for using different data collection procedures and indicate the strengths and weaknesses of each. Some attention is devoted to the criticisms of self-report measures of strategic processing, and we analyze the adequacy of those criticisms. This chapter also reviews the early literature on learning strategies in both second language acquisition and cognitive psychology, including the early work in the second language area by Naiman et al. (1978) and Rubin (1975, 1981), as well as more recent work by Wenden (1983) and others.

In Chapter 5, we highlight and describe in detail the studies we have performed in both English as a second language and the foreign language areas, illustrating the use of different types of data collection methodologies, which include retrospective interviews and think-aloud procedures. One of the studies examines strategies used with a variety of language learning tasks that are characteristic of ESL classrooms, one focuses on listening comprehension, and others concentrate on the varied language tasks that are found in foreign language classrooms.

The focus of Chapter 6 is on studies in which second language students have been trained to use learning strategies. The chapter begins with an analysis of the training variables that influence the way in which strategy instruction for second language acquisition is presented. For example, one of the major issues is whether strategy training should be presented separately from or incorporated with course content. Another issue is the extent to which the strategies should be explicitly identified or should be embedded in the materials for a course. The chapter continues with an analysis of recent studies drawn from the psychological literature as well as those from the second language acquisition literature. Again, we highlight the studies we have conducted ourselves, one in an ESL setting and one in a foreign language instructional environment. In each of the two training studies we conducted, students were taught in the natural language learning environment of the classroom rather than trained in a laboratory. In the foreign language study, the trainer was the regular classroom teacher. The training approaches used in the studies are analyzed, with implications drawn for transfer of strategy training with both foreign language and ESL students.

Chapter 7 describes instructional models in which learning strategies play an important role. When we began our early studies, there were no formal instructional models containing learning strategies, although