Form-Meaning Connections in Second Language Acquisition

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Form–Meaning Connections in Second Language Acquisition
Second Language Acquisition Research
Theoretical and Methodological Issues
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Preface

This volume is a selected and substantially revised set of papers presented\(^1\) at the conference on Form–Meaning Connections in Second Language Acquisition (February 21–24, 2002, Chicago, IL\(^2\)). Some 50 papers were presented and plenary speakers included Catherine Doughty, Nick Ellis, Susan Gass, Jan Hulstijn, Elaine Klein, and Bill VanPatten. The concept of form–meaning connections has been around in one guise or another since contemporary first language and second language research began in the 1960s. That the conference theme attracted researchers and scholars from around the world and stimulated lively discussion during and after sessions, suggests that serious interest in this area has not disappeared since the early days of the morpheme studies. The very positive response of the participants and attendees underscored the importance of this topic and the need for it to be a continuing part of mainstream SLA research. We are grateful that we have the opportunity to provide such a focus with the present volume.

As the reader may well know, conferences are not held without the assistance and support of many people and institutions. First, thanks to Stanley Fish, Dean of the College of Liberal Arts and Sciences at the University of Illinois at Chicago, for his substantial financial contribution and for his stimulating and encouraging opening remarks the first night of the conference. We also thank Christopher Maurer and the Department of Spanish, French, Italian and Portuguese, for additional substantial monetary support and for supporting us throughout the conference and this publication. We also thank the Departments of English, Germanic Studies, Latin American and Latino Studies, and Psychology, and the Instituto Cervantes (Chicago branch) for additional monies and support. Last, and certainly not least, we thank all the graduate student volunteers who helped with the conference details and who worked at the registration and information tables as well as Nancy Velez in the SFIP department. As for the volume, we would like to thank Cathleen Petree who had the volume reviewed and then signed it on, Bonita D’Amil who moved the volume on to the next stage, and Sara Scudder and the team at Lawrence Erlbaum Associates, Inc., for their work.

We are also indebted to our friends and families who occasionally had to put up with us while we pulled our hair out during that last few days before and, of course, during the conference. Your continued patience as we worked on this volume reminds us of why you are in our lives.

\(^1\) The exceptions are the first chapter by VanPatten, Williams, and Rott and the final commentary by Larsen-Freeman, who graciously agreed to spend some of her already overstretched time to read the other contributors’ chapters and share her reactions. Bardovi-Harlig’s and Shirai’s chapters were on the program but were not presented at the conference because of scheduling conflicts.

\(^2\) The conference was originally scheduled for September 19, 2001. The attacks on the World Trade Center and Pentagon and the tragedy of United 703 that occurred just one week before rightfully caused considerable distress to many participants flying in from other cities and countries. We felt obliged to postpone accordingly.
CHAPTER 1
Form–Meaning Connections in Second Language Acquisition

Bill VanPatten, Jessica Williams, and Susanne Rott
University of Illinois at Chicago

Form–meaning connections (FMCs) have long occupied the interest of second language acquisition (SLA) researchers. From the early research on acquisition orders to current day minimalist discussion of the interface between syntax and morphology, FMCs have been an integral component of SLA. Learners must grapple with verb inflections, nominal inflections, particles, determiners, and other FMCs as they work their way toward the creation of a linguistic system that bears resemblance to the L2. Just what is involved in the creation of FMCs? Are the processes different from those involving syntax, for example? To what extent does their creation involve multiple processes? What are the relative contributions of learner internal factors and aspects of the input itself?

This volume offers perspectives on FMCs from a variety of disciplines. This introductory chapter attempts to link these strands of research in a unified discussion by turning attention to questions of processing. Empirical and theoretical literature on FMCs has looked at a wide range of behavioral and cognitive subprocesses, beginning with the initial link between a lexical or grammatical form and its meaning(s) to the use of the form by the L2 learner. This introduction examines learner and input factors as they affect different stages of the processing of input. The discussion addresses the following specific aspects of language learning: the establishment, subsequent processing, and use of FMCs. Many questions posed here underlie the more practical issue of the effect of instruction: To what extent must attention be paid to L1-L2 contrasts in teaching? Do universal processing mechanisms overshadow any pedagogical efforts that might be made? Do different aspects of language require different pedagogical strategies? How can factors in the L2 environment be manipulated more effectively. A deeper understanding of how FMCs are made and maintained may help answer some of these questions. The discussion begins with some fundamental considerations, namely, the nature of FMCs themselves.

WHAT IS A FORM–MEANING CONNECTION?
What Is Form?

We take form to mean a surface feature of language or a surface manifestation of an underlying representation. Surface features can include the following:

- lexemes: *eat* (Eng.), *com* (Span.), *mang* (Fr.),
- verbal inflections: *-ed* (Eng.), *-Ø/-é* (Span.), *-it/-u* (Fr.)
- nominal inflections: *he/him* (Eng.), *é/lé/lo* (Span.), *il/lui/le* (Fr.)
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- nominal derivational inflections: dis-advantage, thought-less
- adjectival inflections: abierto/abierta (Span.), overt/overt (Fr.)
- functors including complementizers, classifiers, determiners, and particles such as wa and ga in Japanese

To be sure, not all languages share the same surface features and not all languages make use of the features to the same degree. Agglutinative languages, such as Quechua, make much more use of inflections on nouns and verbs to convey meanings that Indo-European languages, for example, would convey by prepositions, adverbs, or some other free-standing lexical item or morpheme (Langacker, 1972; Spencer & Zwicky, 1998).

All of the forms listed correspond to target language features and categories. The chapters in this volume use the term form as suggested by the previous list; that is, form is viewed as lexicon, inflections, particles, and the like. These are not the only units of language acquisition, however. Formulaic expressions and routines larger than individual words (e.g., Bardovi-Harlig, 2000; Ellis, 1996; Krashen, 1981; Myles, Hooper & Mitchell, 1998; Myles, Mitchell & Hooper, 1999; Peters, 1985; Skehan, 1998; Weinert, 1995; Wong Fillmore, 1976) can be considered forms in the sense that learners can extract them from the input and assign them a meaning or function.

What Is Meaning?

Meaning is understood in a variety of ways. In the field of linguistics, lexical semantics has tended to dominate the field, with extensive research on the lexical–semantic–syntactic interface underscoring the importance of verbs in projecting sentential syntax. For example, the verb dry contains information related to its meaning: <agent, patient> and [[X ACT] CAUSE [Y BECOME DRY]]. This information reveals that both an agent and patient are involved in making the activity of dry to come about and that the activity involves a change of state that is caused by something (Levin & Hovav, 1998).

Looking at meaning as it applies to surface features of language, it can minimally refer to the following:
- concrete semantic referential meaning: in English, [kaet] means a four-legged feline
- displaced or abstract semantic referential meaning: -aba- in Spanish means nonpunctual so that when a speaker is narrating some past event, that person is indicating an event or state in progress

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1 These forms are somewhat unusual in that they do not encode meaning. For this reason, they are not discussed further in this chapter.
2 The one exception is Klein, who in Chapter 8 argues for an examination of the role of L2 parsing in SLA, which means looking at entire sentences in addition to some individual surface features.
• sociolinguistic meaning: when vous is used instead of tu in French the speaker indicates something about politeness, deference, and/or social distance

• pragmatic meaning: when someone says “Why don’t you take a break?” the intent of this utterance is understood, that is, it is a suggestion and not a real Wh-question that demands a “because…” answer

In the present volume, it is clear that the various authors intend the real-world referential definition of meaning with semantic content. In this discussion, meaning is also restricted to this narrower sense. Thus, this volume is concerned with concrete, displaced, or abstract referential value such as number, temporal reference, agency, aspect, and lexical reference.

What Is a Form–Meaning Connection?

It may seem obvious that a form–meaning connection is a situation in which a form encodes some kind of referential meaning. However, the situation is a bit more complicated. Three distinct possibilities present themselves:

1. one form encodes one meaning
2. one form encodes multiple meanings
   a. in different contexts
   b. in a single context
3. multiple forms encode the same meaning

Forms with a one-to-one correspondence with meaning do exist, although this is not the only type of form–meaning relationship. In Japanese, ga means only one thing: “subject or agent” in a nonpassive sentence. In Turkish, lar means “more than one.” In Spanish -mos exclusively means first person plural. Forms that have multiple meanings are more complex. In Spanish, the pronoun se can refer to real-world reflexivity as in Juan se ve ‘John sees himself’, and it can refer to unspecified subjects as in Aquí se vive bien ‘One lives well here.’ It can also refer to datives (i.e., stand in for dative pronouns) when direct object pronouns follow in sequence as in Juan se lo dio a María ‘John gave it to Mary’. With lexical forms, homonyms are examples of one form having multiple meanings. The word [plen] (spelled either ‘plain’ or ‘plane’) can refer to at least the following: simple; not pretty; a flat expanse of terrain; a type of craft for air transportation; a tool used to shave off small amounts of wood; the act of shaving off small amounts of wood; the act of tires skimming on wet pavement. Thus, the same form may encode different meanings depending on context. It is also possible for a form that encodes multiple meanings at once. For example, the German article dem encodes many components of meaning: definiteness, dative case, singular, and either masculine or neuter gender. No part of the form can be uniquely linked to a specific component of meaning.

Finally, some forms share meaning. This is not unusual in the case of lexical items and bound morphemes. For example, pastness can be encoded by both a temporal lexical item (‘yesterday’, ‘before’) as well as bound and
unbound morphemes (‘was’, ‘-ed’). Plurality can be encoded by quantifying modifiers (‘many’, ‘two’) as well as by bound and unbound morphemes (‘teeth’, ‘-s’). Different bound morphemes may map onto the same meaning: In Spanish, -aba- and -ia- both encode pastness and nonpunctual aspect. They only differ in that they must be used with particular classes of verbs whose distinction is not semantic. -aba- can only be used with verbs with a for a theme vowel (e.g., hablar), whereas -ia- can only be used with verbs with theme vowels e/i (e.g., decir, beber). Another example of forms sharing meaning are the derivational inflections dis-, non- and un- in English (e.g., dishonest, nonnative, uneven). These morphemes all mean “opposite of” or “not” and their distribution is based on nonsemantic features of their words they attach to (e.g., in general, non- attaches to nouns; dis- attaches to nouns, adjectives, and verbs; and un- attaches to adjectives). Bound morphemes can also overlap in meaning. As noted, in Spanish -aba encodes pastness, first/third person singular, and nonpunctual aspect; in contrast, -ió encodes the meanings of pastness, third person singular, and punctual aspect. Thus, these two verb inflections overlap in their encoding of pastness, but they do not encode exactly the same meanings.

The discussion has identified FMCs as connections between an L2 form and its L2 meaning. However, L2 forms can also be connected to meanings that are not L2-like. For example, Jarvis and Odlin (2002) reported that Swedish learners of English mapped L2 prepositions onto L1-based spatial concepts. Similarly, referential meaning can be connected to a form that is not L2-like (or only partially so). A learner of French may incorrectly assign ne to the meaning of negation, based on the distributional bias (Andersen, 1990) of this form in negative declaratives (e.g., Le chien ne mange pas ‘The dog is not eating’) in the L2. In fact, it serves a purely grammatical function in certain kinds of expressions (e.g., Je n’ai que deux class ‘I only have two classes’). Unanalyzed chunks, such as comment t’appelles, lookit, or dunno, are further examples of L2 derived interlanguage (IL) forms that learners may map on to specific referential meanings (Myles, et al., 1999; Wong-Fillmore, 1976).

WHY LOOK AT FORM-MEANING CONNECTIONS?

The establishment of FMCs is a fundamental aspect of both first and second language acquisition. All but a few L2 learners pursue meaning first, in an effort to communicate and to understand the world around them. Research in a variety of contexts attests to this impulse (e.g., W. Klein & Perdue, 1997; Krashen, 1982; Perdue, 2002; VanPatten, 1996). This often, though not always, means that lexical acquisition takes precedence over the acquisition of grammatical features of the language. Indeed, it has been argued that processes involved in the acquisition of the semantic and formal components of words are distinct (N. Ellis, 1994).

However, establishing FMCs goes beyond lexical learning. The acquisition of important subsystems in interlanguage grammars involves almost exclusively the relationship between forms, their meanings, and how the connections between the two are established. The most researched of these is the
tense-aspect system. In the present volume, this robust area of research is represented by Bardovi-Harlig's study on the acquisition of the future system and Shirai's overview and discussion of the development of tense-aspect in general. These complex systems within a larger grammatical system evolve over time much as other parts of the learner's grammar do. How and why they evolve is critical to understanding interlanguage development as a whole.

Despite the clear importance of FMCs, they have not often been a central focus in SLA research. In the burgeoning research from a Chomskyan perspective since the mid-1980s, syntax has continued to be the center of the bulk of research from a theoretical perspective (for an overview, see Hawkins, 2001). However, this strand of research may be more closely connected to FMCs than it first appears, and there is good reason for those exploring second language syntax to concern themselves with FMCs. Current Minimalist perspectives clearly link syntax and morphology (i.e., inflections and allomorphs, which are aspects of FMCs) either in terms of what is called "feature checking" or in terms of the interface between morphology and syntax for understanding the development of syntax itself (e.g., Beck, 1998; Radford, 1997; White, 2003).

It seems that continued examination of the what, why, and how of establishing FMCs during second language acquisition is a profitable endeavor. Its payoff may be seen in theory (e.g., the role that FMCs may play in the development of syntax) and in application (e.g., the effects of instruction). We now consider the processes involved in the acquisition of FMCs.

**ACQUISITION AND FORM–MEANING CONNECTIONS**

Following the ideas of others (e.g., Carroll, 2001; Harrington, 2003; VanPatten, 1996, 2003), we adopt the idea that acquisition must consist of multiple, distinct but related processes that together make up what is commonly referred to as the process of acquisition. Given that the concern here is FMCs, three processes associated with their acquisition are discussed. These processes can be considered stages in that an FMC must go through each process in order to be fully acquired. We will refer to these processes/stages as (1) making the initial connection, (2) subsequent processing of the connection, and (3) accessing the connection for use.

**Making the Initial Connection**

An FMC is initially made when a learner somehow cognitively registers a form, a meaning, and the fact that the form encodes that meaning in some way. The learner either accesses a semantic, conceptual, or functional meaning from existing knowledge to process a new form, or the learner notes from the surrounding linguistic or social context that there is a new meaning or concept to be acquired and that a particular form expresses that meaning. An example of the first is familiar: The L2 learner attaches the concept of 'airplane' with the new form, avión, based on prior (L1) experience (e.g., Jiang, 2002). An example
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of the second might result from an initial encounter with honorifics by an L2 Japanese learner (e.g., Cook, 2001). The learner would have to create a new meaning and connect it to a form encountered in the input (see also Bogaards, 2001; R. Ellis, 1995). This process differs from Schmidt’s idea of noticing in two ways. First, Schmidt’s noticing is restricted to some kind of registration of a form in working memory but does not necessarily entail a simultaneous connection to a meaning or function (see, e.g., Schmidt 1990, 1995, 2001, also Carroll, 2003; Williams, chap. 10 in this vol.). Second, no claims are made about level of awareness involved. Although it is likely that learners may be aware of encountering a novel lexical form (“I wonder what that word means?”), we cannot say that they have the same level of awareness or any at all for various kinds of grammatical form. It is not necessary for the present discussion whether a FMC is made with or without awareness. What is necessary is an exploration of why some FMCs are made but not others.

Given the range of aspects of a given form or meaning that learners must acquire, it is likely that many FMCs are not made all at once. For example, although the lexical form Vogel might be clearly linked to the referent ‘bird’ on the first encounter and available for immediate retrieval, other scenarios are also likely. Initial FMCs may be placed on any point on various continua: partial to complete, weak to robust, nontargetlike to targetlike.

Completeness of FMCs. It is possible for a learner to only connect part of a new form to its meaning, or a new form to part of its meaning. If learners encounter the word Vogel aurally, they may remember only a vague pronunciation or know that “it starts with an [f] sound and has two syllables.” If learners encounter it in written form, they may remember just the first few letters. Another possibility of an incomplete FMC may occur with more complex forms, which, unlike Vogel, are conceptually more complex or linked to multiple meanings. Returning to the example of the German definite article, dem, learners may make FMCs between the form and only one of the meanings encoded into that form. They may simply connect the form with its most salient meaning, arguably, definiteness, and ignore the case, gender, and number components of its meaning (Andersen, 1983). Similar arguments have been made for the acquisition of tense-aspect morphology, with learners first establishing FMCs for prototypical components of meaning, such as "action-in-progress" for the progressive aspect (Shirai & Andersen, 1995). It is likely that FMCs continue to be elaborated with increased exposure as learners add complex layers of meaning and usage to the connections they have made. This is certainly true of lexical forms; after learners have made a basic connection between a word and its meaning, they will encounter additional, perhaps somewhat different, meanings for the form, distributional restrictions, and collocational regularities (Bahns & Eldaw, 1993; Schmitt, 1998).

Robustness of FMCs. Completeness is not the only measure of an FMC. A learner may make a complete FMC, but it may initially be weak, that is, the connection may quickly fade if not strengthened by subsequent input. N. Ellis
(2002, chap. 3 in this vol.) argues persuasively for the importance of frequency in language processing and acquisition, a perspective consistent with the notion of the increasing robustness of FMCs that are confirmed by subsequent input. A learner’s first encounter with Vogel may leave a trace of the entire word in memory, lightly "penciled in" (see VanPatten, chap. 2 in this vol.) such that the learner’s next encounter with this form in the input will result in a stronger connection (see next section). This initial lack of either completeness or robustness of a memory trace can be caused by any kind interference while processing the new form that causes attentional resources to be overwhelmed (Baddeley, 1990). This does not necessarily mean, however, that the default situation is that learners tend to make complete and robust connections from the outset and that interference in processing disturbs the connections. It is more likely that learners—especially in the early and intermediate stages, if not longer—tend to make incomplete initial mappings and less than robust connections.

Target-like Nature of FMCs. There is no guarantee that an FMC will be target-like or even reflect target language categories. It is possible that the learner would link Vogel to ‘chicken’, or that comia would be linked to conditional rather than the target-like imperfect meaning, or that comió will be overgeneralized to other past contexts. There is extensive evidence of initial FMCs between perfective marking and telic meaning (Bardovi-Harlig, 2000; Collins, 2002; Lee, 2001; Shirai, chap. 5 in this vol.) in spite of the fact that the distribution of form and meaning in the L2 may not always reflect this connection. Finally, it is also possible that meaning will be linked to unanalyzed L2 forms, in other words, incorporated into the developing IL as chunks, separate from its components. This has been shown to occur with the English dunno (Bybee, 2002).

Subsequent Processing

Once an initial FMC has been made, what happens next? We argue that there are always psycholinguistic consequences of the initial FMC, however weak or incomplete they may be. According to N. Ellis (chap. 3 in this vol.), "any event, any experience produces a distributed pattern of activity in many parts of the cognitive system." Repeated exposure to the forms in these incipient FMCs offer several possibilities regarding robustness, completeness, and proximity to target: Initially incomplete FMCs, in which only one or some of the possible connections have been made, may be filled in for a more complete mapping. An initially weak FMC may be strengthened. It is also possible that if the processing of subsequent input results in conflicts with an existing FMC (possibly a nontarget-like one), then the learner’s language system will be forced to make adjustments both to that FMC or possibly to others as well.

Filling in. If the initial FMC is incomplete, then subsequent encounters may fill in additional elements of either the form or its meaning. For the lexical item Vogel, if the initial connection resulted in the partial entry, "starts with an [f]
sound and has two syllables, further exposure may allow the learner to establish a more complete phonological representation. Meaning and concepts may be filled in a similarly incremental fashion. Following multiple encounters, semantic boundaries of a word may be expanded (Schmitt, 1998) and conceptual characteristics refined. L2 learners may discover in a specific context that words have specific pragmatic functions, belong to a certain register, or collocate with other words redefined (Bahns & Eldaw, 1993). Regarding grammatical forms, it was noted earlier that many forms, such as the German definite article *dem*, are more complex than concrete nouns. The initial FMC may link the form to definiteness; a subsequent FMC may be made between the same form and dative case, another with singular, and so on.

**Strengthening**

If the initial encounter with a form in the input results in a weak connection with its meaning, subsequent encounters in the input may add to the robustness of this FMC, increasing the likelihood of long-term retention, although not guaranteeing availability for use. Conversely, lack of subsequent input may have the opposite effect: The FMC may fade and eventually disappear from memory. This is the case with such forms as verbs in the subjunctive mood in Romance languages, which are often taught early on. At the time of instruction, learners may be exposed to appropriate input that contains subjunctive forms and the connections may be initiated. But according to frequency counts in Spanish, for example, the subjunctive makes up about 3% of the verb forms that learners encounter in communicative input (Bull, 1947). Thus, the FMC may fade away and in some cases, show no signs of return. What is more, it has been shown that frequency of one form that is "in competition" with another for meaning may cause the less frequent form to fade. This scenario is illustrated by the well-known U-shaped acquisition of irregular past tenses, which are temporarily "pushed out" by the overwhelmingly more frequent past tense forms. This leads to the next process.

**Restructuring.** So far, the process of making an FMC has been presented as a relatively simple one: A new FMC is made, it is strengthened, becomes more complex (if the FMC itself is complex), or, if there is no subsequent encounter with the form, eventually fades away. However, as already noted, the input often contains forms that are potentially in competition with one another, a situation that may require restructuring of the FMC and more broadly, of the learner's developing IL.

Bardovi-Harlig (2000) and Shirai (chap. 5 in this vol.) describe systems in which there are several formal options for encoding past events. According to Andersen's (1984) One-to-One Principle, learners will initially prefer to match one form to one meaning. In a language such as Spanish, which has a complex system for marking pastness, establishing target-like FMCs may take extensive exposure to and processing of input (see VanPatten, chap 2 in this vol.). A learner who initially associates the ending *-ia* with pastness rather than pastness
1. Form–Meaning Connections in SLA

plus nonpunctuality, may create incorrect forms such as *tuvía 'was having', in which an irregular preterit tense ending (which may be in the processing of being penciled in) is conflated with the “new” past tense ending. In short, the learner takes two different pieces of two different verbs that have been coded for pastness and fuses them. However, continued exposure to tuve and tenia would presumably force learners to modify their original nontarget-like FMC. This process of restructuring can help trim nontarget forms from the IL. A second type of restructuring will affect the initial FMC, but other FMCs in the lexical component of the IL as well. Continuing with the example of Spanish tense, one past tense is used to mark punctual, completed events, another, to mark nonpunctual events and activities. Thus, if the learner's system only contains forms such as llamó 'called' to mark any event or action in the past, recognition that the form llamaba 'was calling' also refers to the past may prompt a new FMC. Unlike in the first example of *tuvía, in this second example there is no nontarget-like form, rather, this is an L2 form used incorrectly. In this case, it is not just the FMC that needs to be restructured, but also how it relates to other FMCs in the IL. Accommodation of this new FMC may force reorganization of part of the IL, in this case, the tense-aspect system.

Restructuring may also have impact beyond the lexical component of the developing IL. In current syntactic theory, there are both lexical and functional categories and languages seem to vary according to functional features (e.g., Radford, 1997). The surface representations of many of these functional features are precisely the types of grammatical forms under discussion here: inflections, particles, determiners, complementizers, and so on. The properties associated with these features are said to drive much of syntactic movement. If an L1 and an L2 differ in terms of movement rules, then the learner must somehow begin penciling in the inflectional features (along with their properties) so that the grammar can evolve toward the correct L2 system of rules. Learning a particular form–meaning connection, for example, could be the catalyst or trigger for such evolution. VanPatten (chap. 2 in this vol.) discusses how learners of English must come to know that English disallows verb movement. He suggests that the FMC contained in do may be the catalyst for this knowledge. Such cases are actually describing the restructuring of the syntax based on the incorporation of a new FMC in the lexicon. (The debate on the relationship between FMCs and syntactic development is addressed later.)

In a different case, Hawkins (2001) described the scenario in which learners of English L2 may not yet have projected an IP (the inflectional phrase of a syntactic tree). In an argument too complex to review here, he suggested that when learners “get” copular be, they will project IP and the syntax will begin to restructure itself, which in turn allows for the incorporation of other grammatical morphology. Thus, the incorporation of just one new FMC can cause a major restructuring of the syntactic component of a grammar.
Access for Use

Access for use applies to both comprehension and production processes. Once an FMC has been integrated into the IL, it is potentially accessible for comprehension and production. Each time the form is accessed for use, the FMC is strengthened, regardless of whether it is target-like. When a form is accessed for comprehension, the process also involves another exposure to the form in context, further strengthening or elaborating the FMC. The important point here is that although access cannot initiate FMCs—after all, one cannot access what does not yet exist—it can strengthen those that are already made. Regarding access for production, de Bot (1996) noted, "Output as such does not play a role in the acquisition of completely new declarative knowledge, because learners can only acquire this type of knowledge by using external input" (p. 549). He went on to argue, however, that repeatedly accessing this connection is more effective for learning than simply perceiving it in the input. Thus, access too has an important role in the FMC process.

Earlier in this chapter it was noted that the process in which FMCs are made and processed is not a uniform one. Why are some FMCs made and not others? Why do some connections grow strong and others fade? Such questions have clear pedagogical implications. Whereas a more global view of language acquisition results in very general questions about instruction (e.g., Does output accelerate learning? Is focus on form effective? Does input enhancement work?), the previous outline of FMCs suggests that these questions cannot be answered about second language learning in general, as if it were a uniform process. In addressing the effectiveness of instruction, Williams (in press) notes "Learner interaction with language data changes at different stages of development, and instruction may impact the acquisition process differently at these various points. Instruction should therefore be targeted thoughtfully, based on where learners are in this process. In fact, however, very little work has explicitly addressed the need to differentiate the effect of (instruction) at specific points of IL development." Clearly, research on instructed SLA will need to develop more focused questions that consider what kind of instruction to affect what kind of process for the acquisition of which/what kind of form.

It is likely that the many factors involved in SLA will impact the different stages and processes described in different ways. The next section, reviews current research and the contributions to this volume for evidence of potential mediating factors and their effects.

FACTORS AFFECTING ACQUISITION OF FMCS

We divide the factors that affect the acquisition of FMCs into two broad categories: learner factors and input factors. Learner factors include knowledge sources shared by learners or groups of learners (e.g., the L1, universals, and universal grammar) and specifics of the individual (e.g., proficiency in the L2). Input factors include aspects of forms and their meanings (e.g., frequency,
nature of the L2 form). The discussion concentrates primarily on the initial creation of FMCs, not because this process is most important, but because this has been where research has concentrated. Where possible, the discussion distinguishes among the processes associated with FMCs that have been outlined and the impact that learner and input factors may have on them.

**Learner Factors**

*L1/Other L Knowledge.* The most general question about L1 knowledge concerns how L1 features affect the learning of the L2. For example, does L1 limit or enhance how L2 input is perceived and processed? Do all L1 features affect L2 learning in the same way? Do L1 features affect the processing of L2 lexical and grammatical aspects differently? These questions have been part of an active research agenda in second language acquisition for half a century (e.g., Andersen, 1983; Cadierno & Lund, chap. 7 in this vol.; Gass & Selinker, 1992; Jarvis, 2000a, 2000b; Jarvis & Odlin, 2000; Jiang, 2002; Kellerman, 1995; Odlin, 1989, 2002; Pavlenko & Jarvis, 2002; Ringbom, 1987; VanPatten, chap. 2 in this vol.).

Regarding FMCs, their completeness, robustness, and approximation to the target may be mediated by the L1. Researchers who assume that language processing mechanisms operate automatically outside of the conscious control of the learner (Carroll, 2001; VanPatten, chap 2 in this vol.) propose that beginning learners automatically apply L1 parsing procedures when processing the L2. L1 parsing procedures may lead to an indistinct memory trace or even block the processing of particular L2 forms if the constituents in the L1 and the L2 do not follow the same linear order (see Rounds & Kanagy, 1998; VanPatten, chap. 2 in this vol., for examples). It is not only parsing procedures that are affected by the L1. Cadierno and Lund (chap. 2 in this vol.) demonstrate how the encoding of semantic components of events in the L1 can influence their encoding in the L2. If an L2 does not have the same system for encoding two separate semantic components in a single verb (e.g., movement and manner in Danish), connections may only be made between L2 forms and meanings that exist in the L1. In other words, only a partial FMC will be established, one that resembles the L1 more than the L2.

Similarly, for lexical development, L1 concept characteristics may interfere with L2 acquisition because L2 learners conceptualize L2 words through the L1 until they achieve a high level of proficiency (N. Ellis & Beaton, 1993; Jiang, 2002; Kroll & Tokowicz, 2001). That is, an L2 word is initially mapped to an L1 concept, which may not have the same conceptual features. Words that relate to concepts that are firmly grounded in physical reality are more likely to share conceptual features from L1 to L2, but more abstract words do not necessarily share the same boundaries and may vary in attributes across languages (e.g., words such as democracy, guilt, or penance). The influence of the L1 in lexical development may take many forms and is not always predictable. When L2 forms are very different from their L1 equivalents, learners may fail to make FMCs, as Laufer and Eliasson (1993) found for