Incomplete Acquisition in Bilingualism
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Incomplete Acquisition in Bilingualism. Re-examining the Age Factor
by Silvina A. Montrul
Incomplete Acquisition in Bilingualism

Re-examining the Age Factor

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CHAPTER 1

Foundations

This book is about non-native like attainment, and its purpose is to re-examine age as a determining factor in non-native outcomes. Because age effects have played a particularly prominent role in some theoretical perspectives on second language acquisition, in this book I re-examine these theories in light of the existence of apparently similar non-native outcomes in adult early bilinguals who, unlike adult second language learners, acquired two or more languages in childhood. Toward this end, I show that many of the characterizing features of adult second language acquisition are also true of many language minority-speaking bilinguals or heritage speakers who either never fully acquired, or lost, aspects of their first language sometime in childhood. I highlight how age of acquisition – a macro-variable that subsumes other interrelated factors (maturational state, biological age, cognitive development, degree of first and second language proficiency, amount of first and second language use, among others) – is related to the type of linguistic knowledge and behavior that emerges in the two languages under different environmental circumstances. By underscoring age of acquisition as a unifying factor in the study of L2 acquisition and L1 attrition in bilingualism, my main claim is that just as there age effects in L2 acquisition, there are also age effects, or even perhaps a critical period, in L1 attrition.

To get some idea of the complexity and variability of bilingual outcomes in the first and second language, consider the following specific examples of possible profiles in adults.

1. Some outcomes of language acquisition

Meet Kevin, a 25 year old male who was born and lived all his life in a small city in England, in a predominantly English-speaking environment. Kevin attended elementary and secondary school in English. In college, he majored in history, but also took Spanish and French as foreign languages. His command of English is native, while his linguistic ability in Spanish and French is very basic and less proficient than when he was in college three years ago.
Carolina, age 35, was born and schooled in Venezuela and came to pursue graduate studies in biology in the United States when she was 24. She started learning English as a foreign language in Venezuela at 13, and by the time she came to the United States, she could speak and understand English very well. However, while her Spanish skills are native, even after 11 years of living in the United States and interacting with many English-speakers, Carolina still has a heavy foreign accent in English and makes grammatical errors when she speaks and writes.

Francesco, a native of Italy, immigrated to Argentina when he was 30 years old and has been living there for 15 years. His wife, whom he married two years after immigration, and his 3 children are from Argentina. Spanish is the language spoken at home, since neither his wife nor his children speak Italian. Francesco also speaks Spanish exclusively at the bank where he works. After so many years of living and working in Argentina, Francesco’s written and spoken Spanish are excellent, and most Argentines consider Francesco a native Spanish speaker. He has no foreign accent and hardly ever makes lexical or grammatical mistakes. Francesco lives in a town where there is no Italian-speaking community, and only uses Italian when he calls his family in Italy every month. Although Francesco speaks Italian fluently because he is a native speaker, his family tells him that he speaks Italian with a foreign accent. In fact, when he speaks Italian, Francesco sometimes has difficulty finding the right words and, on occasion, uses Spanish words inadvertently.

These three hypothetical individuals were each monolingually raised and schooled in their countries of origin, and became native speakers of English (Kevin), Spanish (Carolina), and Italian (Francesco). They all have full command of their first language. Kevin, Carolina and Francesco have command of a second language as well, which they learned later in life, after the foundations of their first languages were in place: Kevin learned Spanish and French, Carolina English, and Francesco Spanish, but they all attained different degrees of oral and written proficiency in these languages: Kevin has basic knowledge of Spanish and French, Carolina has advanced proficiency in English, while Francesco passes as a native speaker of Spanish. This sharp difference in general mastery of the first and second language(s) by adults – full L1 acquisition but incomplete L2 acquisition – constitutes one of the tantalizing mysteries and theoretical problems guiding a great deal of research in contemporary second language studies. But is incomplete acquisition unique to the adult L2 acquisition situation, or is it also possible to have different degrees of incomplete knowledge of the L1? What are the linguistic characteristics of L1 and L2 incomplete acquisition, and what factors contribute to them? Does age play a role in incomplete L1 acquisition as well? Or is it just
input? Before addressing these questions, take a few minutes to consider these five more other bilingual profiles.

Kristi, 38 years old, was born in China and adopted by an English-speaking Canadian family when she was two years old. She has lived in Canada ever since. She went to English-speaking schools and received some instruction in French as well. Although she heard and learned some words in Chinese as a first language before adoption, she did not interact with Chinese-speakers after adoption. Kristi claims to have no recollection of Chinese. She considers English her native language, and she speaks it like a native Canadian.

Elena is 24 years old and lives in France, where she was born. Her mother is Russian and her father French. When she was a child, her mother spoke to Elena exclusively in Russian while her father used French with her. By the time Elena started French-speaking pre-school, she had a balanced command of both French and Russian. However, most of her school friends spoke French. Gradually, Elena started to use French more often at home, even when her mother spoke Russian to her, and for several years she did not speak much Russian. Now at 24, Elena is very fluent in French, but her Russian did not develop to the same level as her French. Although she can presently understand and speak Russian with some proficiency, she makes many grammatical mistakes in the language.

Carlos, Alicia, and Beatriz are siblings and live in the United States. They were all born in Northern Mexico and immigrated to the United States with their parents twenty years ago, when they were 9, 4 and 2 years old, respectively. Carlos attended three years of elementary school in Mexico. Upon arrival in the United States, he was enrolled in an English-speaking elementary school and spent the first two years in ESL classes because he did not speak any English when he arrived. Alicia spoke Spanish, and Beatriz was still learning it when they arrived in the United States. Alicia and Beatriz were enrolled in full-time English-speaking day-care and pre-school soon after arrival, since the two parents had to work. At home, the parents spoke Spanish with each other and to the children. In two years, the sisters were very fluent and dominant in English, while Carlos was still struggling to learn it at school. Carlos used Spanish a lot with his parents, while Alicia and Beatriz preferred to speak English among themselves and gradually spoke Spanish less with their parents. Four years later, Carlos was also speaking English to his sisters, and the parents began to use more English at home. Spanish, however, never stopped being used in the family. Now in adulthood, Carlos is very fluent in Spanish and English, even though he uses English at school and at work. He still communicates in Spanish with his parents and can use Spanish at work. Alicia and Beatriz, by contrast, only use Spanish occasionally in their daily lives with their parents and family, and prefer to use English with friends, at
school, and at work. They both feel English is their native language and Spanish is like a second language.¹

Unlike the earlier examples of Kevin, Carolina and Francesco that illustrated successful cases of L1 acquisition and variable outcomes in L2 acquisition acquired later in life, the cases of Kristi, Elena, and Carlos and his siblings represent variations of the opposite situation: an L2 acquired early in life that reaches native-like attainment in adulthood, while linguistic control of the L1 varies dramatically depending on age of acquisition of the L2 and the circumstances surrounding acquisition. In light of these other possible outcomes of early bilingualism, or when the acquisition of two or more languages takes place in childhood, I re-examine the claim that maturational constraints on the language faculty apply mostly to the adult L2 acquisition situation. I argue and demonstrate that maturational constraints play an even more decisive role in cases of L1 loss in early bilingualism than in adult L2 acquisition.

A well established fact of language acquisition is that normally developing monolingual children succeed in acquiring the basic grammar of their environment (their native language or L1) in a relatively short period of time, typically 3–4 years (Crain & Lillo-Martin 1999; Guasti 2002; O’Grady 1997; Snyder 2007). Before they begin school, and without receiving any instruction, children master the basic structure of their native language, including its phonology, morphosyntax, semantics and some aspects of pragmatics and sociolinguistic conventions. Language acquisition in general is characterized as uniform because children exposed to the same language, or dialect, converge on the grammar of other members of their speech community despite variations in input. To give one example of what linguistic uniformity means in this context, mature native speakers of English perceive the ungrammaticality of the question *What did you ask who Patricia gave?* and intuitively know that when there are two wh-phrases in a sentence, they cannot move the second phrase to form a question. This is the wh-island constraint, which L1 acquiring children obey quite early as well (Guasti 2002). The outcome of L1 acquisition is successful, since all normally developing children (with no physiological or mental impairment) eventually master their native language completely and reach native-like attainment. Complete acquisition by a certain age is not an error free process, however. During development, language use during acquisition is prone to errors and may be deemed incomplete. In all languages, there are well-documented developmental stages in different areas of linguistic knowledge, such that some structures and sounds are mastered

¹ Of course, there are other bilingual profiles in addition to the ones portrayed here, such as balanced and unbalanced bilinguals living in a bilingual society. Individuals of this type can be found in Canada or areas of Europe, where one or more official languages are spoken.
earlier than others. Nonetheless, incomplete acquisition during L1 development is temporary and disappears in due course.

With the linguistic foundations of the language and the essentials of native speaker competence in place by the age of 3, language acquisition continues beyond this early period. In cultures and societies where children go to school, around age 4, children's metalinguistic ability develops through emergent literacy and continues at school, where children learn to read and write, expand their vocabulary, and acquire more complex structures. Exposure to rich oral and written input allows children to learn to communicate in different registers and styles, both orally and in writing. At the end of the process, children become educated, literate, adult native speakers capable of functioning in many social and professional contexts. And there are also children who learn their native language in a diglossia situation (Kaye 2001): these children acquire a colloquial variety at home and receive instruction in the standard variety at school (e.g. African American children in the United States, Brazilian Portuguese children in Brazil, children in the Arabic-speaking world). At least in a monolingual context, the phenomenon of fossilization (Lardiere 2007; Selinker 1972), “stabilization” (Long 2003), or arrested development, does not occur in normal L1 acquisition.

Why is it important to establish the nature, course, and outcome of monolingual child language acquisition? In the study of second language acquisition and bilingualism, the notion of mature native speakers is crucial, even though the concept and definition of who exactly is a native speaker remains elusive (Davies 2003; Mack 1997; Paikeday 1985). Native speaker competence continues to be both the ideal and the benchmark against which second language performance is typically measured. As we will see in greater detail in Chapter 2, L2 acquisition by adults differs from L1 acquisition in several respects. One of the leading research questions in the study of adult L2 acquisition within the linguistic tradition is determining the extent to which child L1 acquisition and adult L2 acquisition are similar and different, and why L2 acquisition in particular appears behaviorally distinct from L1 acquisition. Differing from L1 acquisition, the outcome of the L2 acquisition process is, more often than not, variable and divergent, even when optimal conditions for learning the L2 in a naturalistic and instructed environment are available. Furthermore, since L2 learners bring knowledge of their first language to the acquisition of the second language, they frequently cannot overcome the influence of the L1 in some or many grammatical areas. Persistent L1 influence and fossilization lead to differential outcomes of the acquisition process, most of which fall short of the idealized native speaker model.

2. However, literacy is not a fundamental aspect of native-speaker competence, since there are also many cultures with unwritten languages and a sizable number of native speakers.
Due to this critical difference between L1 acquisition in children and L2 acquisition in adults, a “deficit” metaphor has guided a great deal of research on adult L2 acquisition since the inception of the field. Characterizing the outcome and endstate of L2 acquisition by adults as “lack of success” or “generalized failure” (Bley-Vroman 1989), research in this tradition seeks to explain the fact that adults hardly ever reach the level of uniform linguistic attainment observed in L1-acquiring children. At the heart of these child-adult differences is the idea that children are successful because they are exposed to human language during a biologically-determined period in early childhood that is crucial to their developing linguistic skills. Adults, by contrast, are typically exposed to the second language much later. Late onset of acquisition as a macro-variable would explain many of the observed child-adult differences in language learning, in addition to other obvious differences in input and exposure. This idea is known as the Critical Period Hypothesis.

Motivation for this book arose from the collective findings of my own research program on early bilinguals or Spanish heritage speakers over the last six years, which led me to rethink several classic issues in second language acquisition, like the Critical Period Hypothesis, L1 influence and fossilization, the role of innate knowledge, and the role of the environment. In particular, if late onset of acquisition is one of the main reasons behind non native-like attainment in L2 acquisition, what do we make of similar non native-like linguistic achievement in adult early bilinguals? At first glance, the existence of incomplete acquisition of an early acquired language yields claims about maturational constraints that are questionable at best. But further reflection leads us to consider that a mature linguistic system can be incomplete for at least two reasons. The first is because the learning mechanisms themselves are subject to maturational constraints, and this is consistent with the Critical Period Hypothesis position. But the second reason is simply because the amount of input received was not optimal to fully develop and sustain the linguistic system in the first place, even when the exposure occurred early in childhood. Thus, age of acquisition is a necessary, but not sufficient, condition for complete acquisition. My primary assertion is that, hardly a hallmark of adult L2 acquisition, incomplete acquisition is also a possible result – but certainly not the only one – of language acquisition by children and adults in a dual language environment. The vexing question is whether, despite seemingly comparable outcomes, incomplete L2 acquisition and incomplete L1

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3. Indeed, this metaphor is also prevalent in fields other than strict second language acquisition. In his most recent book *Language Interrupted*, McWhorter (2007) stresses the role of “incomplete acquisition” by L2 learners as the main driving force responsible for language change and simplification in standard languages at the macro-sociolinguistic level.
acquisition are fundamentally distinct. In essence, this book opens an entirely new perspective on the question of age and ultimate attainment in adult L2 acquisition by bringing to the discussion other bilingual populations that speak directly to these issues. Although the question of age has been extensively discussed in the second language acquisition field, this book breaks new ground in addressing the role of age in both the acquisition of an L2 and the potential loss of the L1 in language minority immigrants immersed in an L2 environment. In sum, the discussion of L1 loss in the context of L2 acquisition makes this book substantially different from other classic and current treatments of age effects in L2 acquisition (cf. Herschensohn 2007, for example).

While underscoring the role of age in both L2 acquisition and L1 loss, my goal is to also show that many of the seemingly peculiar features of second language acquisition or late bilingualism – such as transfer, fossilization and incomplete ultimate attainment – are also typical of other early bilingual situations. But even though the book is about incomplete acquisition, my intention is not to support or perpetuate the “deficit” view of bilingualism often endorsed among the non-academic public. The term “incomplete” should be understood as a descriptive term, not a value judgment. Even when bilingual ultimate attainment in one or both languages may diverge from native speaker competence, and a bilingual may not be two monolingual individuals in one (Grosjean 1989, 1998), bilinguals have essentially the same type of abstract linguistic system, since many aspects of their languages also fully converge on the target. I maintain that many bilingual individuals are very competent speakers and users of two or more languages, and it is indeed possible to find many adult L2 learners and early bilinguals of minority languages who have reached native-like attainment in their L1 and L2. At the same time, these cases are not the focus of this book; instead, I focus on cases of incomplete acquisition for both conceptual and methodological reasons.

My other theoretical goal, allied with the first, is to go beyond apparent similarities between early and late bilinguals and to explore potential differences between incomplete L1 and incomplete L2 acquisition as a function of age. If the essence of native speaker competence develops during a critical period and is not much affected by experience, it follows that once acquired, such basic linguistic knowledge should remain relatively stable and accessible throughout the speaker’s lifespan. Is there substantial evidence for the claim that despite incomplete acquisition in a number of grammatical areas, the nature of grammatical knowledge acquired before and after the critical period is still very different in nature? I suggest that even when an L1 may be partially lost or incompletely acquired in early bilingualism, it still retains the signatures of a first language because it was acquired during the Critical Period. This is the Weaker Language as L1 Hypothesis, which I introduce in Chapter 4. But questions such as whether, and how,
incompletely acquired L1 grammars differ from incomplete L2 grammars in fundamental ways, are a matter of ongoing and future investigation.

Methodologically, to understand the process and outcome of bilingual acquisition and the variability that characterizes it, the most common research approach is comparison with a target monolingual norm, including monolingual acquisition in typically developing children and adult native speakers of the target language. Systematic departures from monolingual grammars may be due to the very nature of bilingualism itself, and to the cognitive demands of handling two independent linguistic systems under communicative pressure. What I also do in this book, is to introduce the methodological comparison of different types of adult bilinguals – adult L2 learners and adult early bilinguals – who differ on age of acquisition of their L1 and L2 and many other sociolinguistic and environmental circumstances. Ultimately, understanding the process and different linguistic outcomes of normal language acquisition under different environmental conditions sheds light on the nature, organization, and limits of the human language faculty, and this is the collective goal of linguists studying language acquisition and disruption under different circumstances and from different theoretical approaches.

Beyond these theoretical and methodological concerns, systematic comparison of incomplete L1 and L2 speakers also bears great practical significance. It is widely recognized that the face of second language classrooms in Western Europe and North America has been changing dramatically in the past years, due largely to recent demographic patterns reflecting the waves of continuous immigration. Increasing numbers of bilingual speakers of minority languages like Elena, Carlos and his siblings wish to maintain and/or (re)learn their family language while they acquire second language skills in the majority language. As a result, traditional foreign/second language classes typically geared to students like Kevin, who have no background in the language, have increasingly been opening doors to speakers who were exposed to the language early in childhood and whose levels of oral proficiency in the language range from minimal to advanced. While much is known about how to best instruct typical second language learners, far less is known about the linguistic skills of bilingual speakers of minority languages (also known as heritage or ethnic community languages) and what types of gaps they have in their knowledge.

Today, many institutions place these heritage language learners like Elena, Carlos, Alicia and Beatriz in foreign language classrooms that follow a traditional second language curriculum, while other institutions have created special courses to address the specific linguistic and cultural needs of these speakers. In order to better serve the needs of this immigrant population and help them reach their full linguistic potential in the heritage language, more needs to be unraveled about the nature of heritage language knowledge and its acquisition. Therefore, comparison
of adult L2 learners (exposed to the L2 late) and bilingual speakers of minority languages (exposed to their L1 early) will eventually allow us to see whether there are long-lasting benefits of receiving input early in childhood in incomplete grammars, and how once in the classroom, such early acquired knowledge may react to formal instruction. Future curriculum development would benefit greatly from a basic understanding of these types of language learners (Brinton, Kagan & Bauckus 2008; Kondo-Brown 2004, 2006).

In sum, by contributing to classic and current theoretical debates on the role of age and the nature of linguistic competence in second language acquisition, this book brings together the fields of second language acquisition, early bilingualism, and language attrition. In forging a link between child and adult bilingualism, I also hope to contribute significantly to the growing field of heritage language acquisition and teaching.

One cannot talk about the role of age in language acquisition without making reference to the Critical Period Hypothesis, a topic that has been extensively addressed over the years but still continues to generate debate. Hence, § 2 introduces the concept of the critical period and illustrates how it has been argued to apply in L1 language acquisition. Since the book is about bilingualism and how age affects bilingual outcomes, a brief introduction to bilingual acquisition is presented in § 3. Section 4 characterizes the notion of incomplete acquisition. Finally, § 5 offers an overview of the organization of the rest of the book.

2. The critical period hypothesis

One prominent explanation for why children acquire the ambient language relatively fast and successfully is biological. The innateness hypothesis states that human language is part of the human endowment. The universality and the early emergence of many structural principles of language in L1 acquisition have led many linguists to argue that such structural principles must be innate, as specified by the theory of Universal Grammar (Chomsky 1981; Crain & Thornton 1998; Guasti 2002; Pinker 1991). These grammatical principles emerge early, are universal, and appear without decisive evidence from the environment. The alternative to the innateness hypothesis is the learning hypothesis (also known as emergentism), according to which language acquisition is not as fast as the innatist position makes it out to be. This approach sees language as part of general cognition (i.e., cognition is innate but language is not a specialized, innate module of the mind), and learned largely from experience with the environment (Tomasello & Bates 2001; O’Grady, in press).
One hallmark of biologically determined behavior, both in humans and animals, is the existence of a critical period (Bornstein 1987; Colombo 1982; Oyama 1976). The critical period refers to a temporal span, early in life, of heightened sensitivity to environmental stimuli. The phenomenon is physiological in nature and involves changes in the central nervous system during the course of development. For some researchers, critical periods refer to behaviors that are critical for species’ identification and survival (Brauth, Hall & Dooling 1991). Although no specific external event causes the behavior to emerge, if the organism does not receive sufficiently rich environmental stimuli during its critical period, then the behavior is not likely to develop properly. For Colombo (1982), a critical period must have an onset, a terminus, an innate maturational component, an extrinsic component that stimulates the innate component, and a system that is stimulated during the period. A graphic representation of what a critical period looks like is given in Figure 1.1. (See also Birdsong (2005) and Hyltenstam & Abrahamsson (2003) for other diagrams.)

Classic examples are filial imprinting in birds, the development of birdsongs, visual development in kittens and monkeys, and the social behaviors of a variety of mammals (Bornstein 1987). As for critical periods in humans, Bornstein (1989) also refers to vision. Naturally, language is another likely candidate.

The biological foundation for language and its relevance for the critical period hypothesis was originally proposed by Penfield (1953) and Penfield and Roberts...
(1959) based on neurological evidence. Due to progressive lateralization and loss of plasticity in cerebral functions, the neural substrate required for language acquisition is no longer available after the closure of the critical period:

When a child begins to speak, there develops a functional specialization in one cerebral hemisphere, normally the left hemisphere . . . There are separate areas of the cortex on this, the dominant side which comes to be devoted to the formulation and understanding of speech . . . But, once functional localization of acquired skills has been established, the early plasticity tends to disappear.

(Penfield & Roberts 1959, pp. 203–206)

Studying human development, Lenneberg (1967) also subscribed to the view that the capacity of first language learning was lost if it was not activated or exercised during the critical period, the onset of which he set at age two (the two-word stage), the terminus at around age 13. Again, evidence from the hypothesis came primarily from the dramatic difference between young children and adults in their recovery after aphasia, the dissociation of language from other cognitive abilities (or the capacity of some children to acquire language successfully despite other cognitive deficiencies), and the neurological plateau that children reach at puberty. Like Penfield, Lenneberg also proposed brain lateralization as a likely cause for the loss of a language acquisition advantage at puberty.

If the neurological basis of Lenneberg’s claims have had some acceptance (in addition to a fair amount of criticism), the specific age ranges for closure of the critical period or for loss of brain plasticity have been questioned. Corballis (1991) claims that the human brain is already lateralized from early infancy. But in the context of adult L2 acquisition Hyltenstam (1992) has shown that loss of linguistic ability starts as early as 6 years of age (see also Penfield & Roberts 1959 and Krashen 1973). There is even mounting empirical evidence that core aspects of language (phonology, morphology, syntax, lexicon) are differentially affected in their susceptibility to deterioration effects at different ages (Bialystok 1997; Bialystok & Hakuta 1999; Long 1990). This has already been captured in Seliger’s (1978) concept of multiple critical periods for subcomponents of language with different onsets (and offsets).5

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4. If the onset of the critical period started at age 2 for Lenneberg, this raises the question of what happens before then. Do children lack language altogether before age 2? Today, we know that linguistic development begins soon after birth, if not in utero, and that children have linguistic knowledge and discrimination of some sort well before they put two words together (Sebastián-Gallés 2006; Werker & Y eung 2005).

5. On this distinction, see also Eubank & Gregg (1999).
While there may be different critical periods for different modules of the grammar in adult L2 acquisition, we do not know whether the same is true of L1 acquisition. Evidence for a critical period for language abilities in children can only be assessed indirectly because it is not ethically possible to set up an experiment whereby children are deprived from primary linguistic input during early life. Original claims about first language acquisition being inevitable and chronologically delimited come primarily from cases of pathological language loss (aphasia or other neurological insult) and eventual recovery in young children. More recent evidence for an optimal, maturationally determined period early in life that strongly favors efficient language acquisition comes from extra-societal children, deaf children, and more indirectly, the creation of creole languages.

2.1 Cases of linguistic deprivation

Perhaps the most cited case of linguistic deprivation in early childhood is Genie (Curtiss 1977), a child who was found in Southern California at the age of 14 and had lived most of her life under inhumane conditions. The daughter of an abusive father and a visually impaired mother, Genie was confined to a small room from the time she was a baby because her father could not stand to hear her cry. If she made any sounds, she was physically punished. When found at the age of 14, Genie was without language. After she was hospitalized, efforts were made to teach her language, and she began to acquire speech well after the onset and (possibly) offset of the critical period.

Genie learned to speak in a rudimentary fashion, very much like a normal two year-old child. However, unlike two-year old children, Genie progressed more slowly and even stopped developing after several years of training. For example, Genie used primitive forms of negation (e.g., No mommy go) for over two years, and could not even produce the first stage of wh-question formation normally produced by children (e.g., Where teddy?). Instead, she produced deviant, incomprehensible questions, such as “Where is stop spitting?” Like her morphosyntactic development, her phonological development was equally rudimentary and abnormal, affecting segmental (sounds) and suprasegmental (stress and intonation) features (Curtiss, 1977; Curtiss, Fromkin, Krashen, Rigler & Rigler 1974).

On the other hand, Genie outperformed normal children in her ability to learn vocabulary. She understood and produced many more words than ordinary children at her same level of morphosyntactic development. But since vocabulary

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6. For more details about her daily life see Curtiss, Fromkin, Krashen, Rigler & Rigler (1974).
learning relies heavily on memory and association, such dissociation in linguistic development indicates that Genie could not handle abstract linguistic rules, or what generative linguists call the computational system. Thus, Genie’s case would provide evidence that the innate linguistic ability, which subserves rapid, implicit, and complete L1 acquisition, is subject to a critical period. Although, according to Curtiss (1977), Genie also suffered some brain damage in her left hemisphere, it is possible that she might have been functioning with the right hemisphere, which is not usually associated with language. Even if Genie suffered some brain damage, Curtiss showed that Genie’s mental age increased by one year for every year after she was found while she was studied, whereas her language abilities did not show a similar increase, stagnating at the level of a normal two-year old. Although this is fairly strong evidence for a critical period for L1 acquisition, one must still be cautious in drawing direct conclusions from this case, because Genie suffered severe psychological and physical abuse. Hence, a great deal of her poor linguistic abilities could be related to permanent damage to other systems.

Other cases of linguistic deprivation, which are less confounded with other types of abuse, are the cases of Victor, the wild child of Aveyron (Itard 1801), and Isabelle (Brown 1958; Mason 1942), the child of a deaf mute.7 Victor was also found at the age of 13 years and is described as having no spoken language, although he could understand some. He was able to produce a few sounds, and his comprehension outperformed his production abilities. Isabelle was found in Ohio in the 1930s at the age of 6 and a half years. She had no speech and made croaking sounds. Isabelle and her mother spent most of their time in a darkened room. Yet, once found, Isabelle made significant progress when compared with Genie and Victor. According to Brown (1958, p. 192), “Isabelle passed through the usual stages of linguistic development at a greatly accelerated rate. She covered in two years the learning that ordinarily occupies six years. By the age of eight and a half, Isabelle was not easily distinguishable from ordinary children of her age.”

The fact that Isabelle showed accelerated recovery of language, while Victor (and Genie), who were found much later in life, did not, is compelling evidence for the advantages of receiving linguistic exposure at a specific period early in life, and of how dramatic and irreversible the consequences of linguistic deprivation at an earlier age can be.

7. Unfortunately, the information and linguistic evidence available from these two cases are not as extensive as in Genie’s case, which makes comparison between these cases and Genie difficult.
2.2 Delay of language acquisition in the deaf

More suggestive evidence for the critical period hypothesis in L1 acquisition comes from studies of congenitally deaf children of hearing parents, who are exposed to their first language – a sign language – at different ages (Mayberry 1993; Mayberry & Eichen 1991; Newport 1990). An extreme case of linguistic deprivation is that of Chelsea (Curtiss 1989), who was misdiagnosed as mentally retarded when she was a child, but when she was 31 years of age it was discovered that she was congenitally deaf. After the diagnosis, Chelsea was fitted with hearing aids, and immediately began to receive extensive language therapy. While she was able to acquire a large vocabulary, she did not reach the syntactic level of even a three-year old child. Despite the different reasons for deprivation, Gleitman and Newport (1995) compare the linguistic attainment of Genie, Chelsea and Isabelle to suggest that the difference between all these cases (some basic language in the case of Genie, no language for Chelsea, and full language for Isabelle) supports the view that a pronounced decrease in the ability to acquire a language completely must occur around age 7, or else Isabelle, who started learning at age 6 and a half, would not have been so successful. Early and middle childhood is the period in which human beings are biologically equipped to learn language effortlessly.

The most compelling evidence to date for the upper bounds of ultimate attainment comes from studies of the acquisition of American Sign Language (ASL), which approximate experimental investigations. Newport’s (1990) seminal study examined three groups of congenitally deaf ASL learners (ages 35–70) who were exposed to the language at different ages: native learners first exposed to ASL in infancy (from birth to age 3), early learners between the ages of 4–6, and late learners after age 12 (puberty). All subjects had a minimum of 30 years of daily exposure to ASL. The three groups were tested on the comprehension and production of aspects of ASL syntax and morphology (basic and topicalized word order, subject-verb and object-verb agreement, verbal classifiers of motion verbs, aspect and number morphology, and derivational morphology distinguishing nouns and verbs). Results showed that the three groups performed equally well with ASL word order. However, there was a clear age effect for morphology: the native learners were very accurate, the early learners were good overall but had some errors, while the late learners’ performance on the tasks was quite deficient. Similar results were found by Mayberry (1993), Mayberry and Eichen (1991), and by Neville (1995).
2.3 Creole genesis

Another type of evidence that points to the primacy of language acquisition and perhaps innateness during an optimal period in early life comes from the development of language-like behavior in children who lack normal linguistic input. One example is the formation of creole languages in cases where populations are displaced, as in plantation creoles in the Caribbean, the Indian Ocean and Hawaii (Bickerton 1981, 1999). When speakers of mutually unintelligible languages have to live and work in close proximity with one another for several years, they resort to a kind of (“simplified”) language called pidgin. Pidgin languages have simple syntax (no embedding, frequent ellipsis of arguments and verbs), and lexical items have impoverished inflectional morphology.

Children whose parents, caregivers or interlocutors speak pidgin languages are not exposed to grammatically “rich” input. Because more complex grammatical items cannot be found in the input, as in the case of normal language acquisition, these children create a more complex grammar by recruiting lexical items and bleaching them of their normal lexical meaning (Bickerton 1988). This is akin to the process of grammaticalization by which lexical categories become functional categories (function morphemes). By making language more grammatically complex (by adding Tense-Aspect-Mood (TAM) inflectional morphology, embedding, movement of phrases, etc.) children create a creole, a language with a full natural language structure. In his famous Language Bioprogram Hypothesis, Bickerton (1981, 1984) proposed that a set of unmarked semantic oppositions (anterior/nonanterior, realis/irrealis, punctual/nonpunctual in TAM systems; specific/nonspecific; accomplished/unaccomplished, stative/nonstative) were like semantic parameters driving the emergence of morphology in creole languages. However, since speakers of creole languages have access to the lexicons of the source languages, it is not entirely clear whether the emergence of “structure” is purely biological, as Bickerton suggested, or emerges as a result of functional borrowing from the substrate languages (Bickerton 1984; Sankoff 1979).

According to Newport (1999), the acquisition of signed languages is relevant for the issue of creole genesis, especially for teasing apart the influence of biologically programmed behavior from the influence of pre-existing languages in the environment, given that the latter are not an issue in this context. I mentioned in § 2.2 that deaf children of hearing parents begin their exposure to sign language at different ages, ranging from early childhood to adolescence. However, there are also deaf children whose deaf parents were late learners of signed languages. Late learners show variable degrees of incomplete acquisition of the signed language, and their production is usually replete with morphological errors. In other cases, the parents are not hearing-impaired, but are second language learners of ASL.
Newport compares these deaf children of late-ASL-learning parents with learners of creoles because she argues that both types of learners receive impoverished input. Newport shows that these children are capable of surpassing the linguistic abilities of their parents and are able to construct a more complex grammatical system by making grammatical distinctions more precise, regular, and internally consistent. If there are innate, language-specific constraints for learning languages, it appears that these constraints operate during a maturationally determined period early in life.

An even more compelling case for the Bioprogram Hypothesis is made by Kegl, Senghas and Coppola (1999) in their account of the emergence, after the 1970s, of Nicaraguan Sign Language (Lenguaje de Señas Nicaragüense/Idioma de Señas Nicaragüense). This is a situation in which deaf people remained completely isolated for many years and first developed a system of idiosyncratic and unintelligible home signs. When deaf Nicaraguans had the opportunity to come together and socialize with each other (through schooling and social programs after the revolution), the system of individual home signs gave rise to a pidgin, with oral Spanish as the superstrate. The pidgin became the Lenguaje de Señas Nicaraquíense, a full fledged creole with linguistic complexity. The results of Kegl and collaborators’ studies on NSL contribute, in their view, new and direct evidence in support of the critical period. Young acquirers of NSL (younger than 7) were able to go beyond the input received and grammatically improve upon it. Older signers (older than 7 years of age – younger than 16 years of age), on the other hand, were able to communicate with each other and agreed on some common signs, but unlike the younger signers, were unable to use their innately determined blueprint to surpass the linguistic model.

To summarize, an optimal period for first language acquisition is empirically motivated by a variety of indirect evidence from neurology, extrasocietal children, creole genesis, and deaf populations. Existing case studies point to the conclusion that, if linguistic input and socialization occur before the ages of 6–7, chances of developing a full linguistic system are remarkably good (for example, Isabelle and the young signers). If, on the other hand, exposure to natural language becomes available after age 6–7 and before 13, some rudiments of language can be acquired, although acquisition appears to be incomplete (for example, Genie and the late signers). Finally, if input becomes available well after puberty, a first language has no chance of development (for example, Chelsea). In conclusion,

8. Although Kegl, Senghas & Coppola (1999) put it this way, creole genesis is not direct evidence for a critical period after which language acquisition is impossible. Rather, it is indirect evidence for the innateness of language and for an optimal time in early childhood for language learning.
there is strong evidence for maturational effects in L1 acquisition, with some irreversible consequences if language is not heard or seen (in the case of signed languages) before puberty (cf. Vargha-Khadem et al. 1997). Because the Critical Period Hypothesis has been extended to explain the extent of linguistic attainment in second language acquisition, and because this book is about the role of age in bilingual outcomes, the next section introduces bilingual acquisition.

3. Bilingual acquisition

Broadly defined, bilingualism refers to knowledge and command of two or more languages, albeit to different degrees. Due to the variety of factors that define dual language speakers and hearers (some of which do not play a role in monolingual acquisition) bilingualism comes in many shapes and sizes (Grosjean 1998). Two common parameters that distinguish bilingualism are (1) age of acquisition (early in childhood versus late after puberty), and (2) order or sequence of acquisition in childhood (two languages being acquired simultaneously versus one language being acquired successively, after the other). Even though second language acquisition is treated as a separate field of study, it is a particular case of bilingualism: early (with children) or late (with post pubescent and adults) L2 acquisition. Figure 1.2 illustrates the types of bilingualism discussed in this book.

As Figure 1.2 illustrates, early bilingualism takes place before puberty and can be simultaneous or sequential. Simultaneous bilingualism occurs in early childhood, before the linguistic foundations of the languages are in place. It is also referred to as bilingual L1 acquisition (Genesee 2000; Meisel 2001) because the two languages develop together as first languages (two L1s). Sequential bilingualism, on the other hand, happens after the individual has acquired basic command of the first language, which for monolingual acquisition is typically taken to be roughly the age of 3–4. In this situation, there is a first language (L1) and a second language (L2) sequentially ordered. Sequential bilingualism can occur early, during childhood; or late, in adulthood. Early sequential bilingualism is equivalent to child L2 acquisition in the L2 acquisition field. Early child L2 acquisition probably spans about 2 years and occurs between the ages of 4–6, when spoken language is practically fully developed but the children have not yet received formal schooling. Late child L2 acquisition spans the elementary school years, when children are receiving formal instruction in one or in the two languages (depending on their sociolinguistic circumstances). Late sequential bilingualism is adult L2 acquisition. In this situation, the L1 has been acquired completely and, with the exception of vocabulary size which can increase or decrease depending on domains
of use throughout the lifespan, the L1 syntax and phonology are assumed to remain stable throughout adulthood.

Two other parameters along which bilinguals vary greatly are proficiency and relative balance in the two languages. Proficiency and balance are related to the degree of ultimate attainment in the two languages. Although balanced proficiency (with native-like command of two languages) is a possible outcome of bilingualism, it is indeed very rare (Grosjean 1989, 1998). The reality is that most bilinguals are linguistically unbalanced, both functionally (in their language use) and representationally (in their linguistic knowledge). Bilingual speakers typically possess a stronger and a weaker language. The stronger language is more native-like than the weaker language. However, the relative strength of the two languages fluctuates along the lifespan depending on a variety of factors, such as age and order of acquisition, as well as what language is most often used and preferred in the community (i.e., the sociolinguistic status of the languages as majority or minority languages), and the contexts for use of each language (home, church, school, work, etc.).

### Table 1.2 Types of bilingualism by age and sequence of acquisition

<table>
<thead>
<tr>
<th>Bilingual Acquisition Type</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Simultaneous</strong> (birth-age 3)</td>
<td></td>
</tr>
<tr>
<td><strong>Sequential (= L2 acquisition)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Early</strong> (= child L2 acquisition) (childhood)</td>
<td></td>
</tr>
<tr>
<td>Early child L2 acquisition (4–6: pre-school)</td>
<td></td>
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<tr>
<td>Late child L2 acquisition (7–12: elementary school)</td>
<td></td>
</tr>
<tr>
<td>Late (= adult L2 acquisition) (post puberty and adulthood)</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1.2** Types of bilingualism by age and sequence of acquisition

- Simultaneous
- Sequential (L2 acquisition)
- Early (child L2 acquisition)
- Early child L2 acquisition (4–6: pre-school)
- Late child L2 acquisition (7–12: elementary school)
- Late (adult L2 acquisition) (post puberty and adulthood)
Research on late bilingualism or L2 acquisition by teenagers and adults is very extensive and is treated as a separate field of study. Since the 1990s, much research has been conducted on the process of simultaneous bilingual acquisition, while, unfortunately, research on early sequential bilingualism or L2 acquisition by children (4 to 11 year olds) is still relatively scarce in the linguistic and psycholinguistic literature. A common approach to studying the process and outcome of adult second language acquisition is to trace parallels with monolingual acquisition by children. Over the years, much of this research has shown that, with few exceptions, adult L2 learners rarely achieve the degree of linguistic success of normally developing monolingual children, falling short of native speaker performance and competence in specific areas of phonology, morphology, syntax, semantics and pragmatics.

Throughout the process of acquisition, L2 learners make both developmental errors, like L1 learners, and transfer errors due to influence from their L1, especially at early stages. A key difference between L1 and L2 acquisition, however, is that while child L1 learners overcome developmental errors without need for instruction, L2 learners continue to make many errors, even after receiving formal instruction, practice and correction. Fossilization can occur at any point in L2 development. Thus, unlike L1 acquisition by children, adult L2 acquisition is typically characterized as less normal and natural. It is not universal, simply because not everybody learns a second language. In terms of outcome, L2 acquisition is variable because L2 learners do not uniformly attain the same level of linguistic competence in the second language. Furthermore, L2 acquisition is typically incomplete – most learners never reach the competence of a native speaker. Although some researchers argue that attainment of full linguistic competence in the L2 is possible, in principle, it is by no means guaranteed. The nature and outcome of adult L2 acquisition will be explored in more detail in Chapter 2.

A variety of factors, and even their combination, could potentially account for the seemingly disparate outcomes of child L1 and adult L2 acquisition, like cognitive abilities, type of exposure to input, degree of socialization, previous linguistic experience, and so on. Yet the one encompassing factor singled out as most significant in predicting outcomes of acquisition and eventual success is age of acquisition. The Critical Period Hypothesis has featured prominently as a likely explanation for why adult second language learners rarely reach the level of linguistic ability of native speakers (Bley-Vroman 1989, 1990; Johnson & Newport 1989, 1991; Long 1990; Schachter 1990). Following Schachter (1990) and others, non-nativelike attainment is what I term in this book incomplete acquisition.

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9. This does not mean that all L2 learners are incapable of achieving native-like ability. Some certainly do, but again, these individuals are not the focus of this book.
However, as we will see in Chapter 2, empirical support for or against the existence of a critical period in L2 acquisition is not categorical, and this issue continues to generate much debate (Birdsong 1999, 2005, 2006; Bongaerts 2005; Singleton & Lengyel 1995).

4. Incomplete acquisition

Working within the perspective of Universal Grammar, Schachter (1990) (following Bley-Vroman 1989 and others) proposed the Incompleteness Hypothesis to characterize late bilingualism and its non-equivalence to L1 acquisition. Simply stated, an L2 will not develop some linguistic property $x$ completely if L2 input is received after the L1 is fully formed. Further refining this idea, Sorace (1993) distinguished between two possible non native-like outcomes in late bilingualism: incomplete and divergent representations. For Sorace, the incomplete L2 grammar lacks a given property $x$ of the target grammar, just as Schachter proposed. As a result, L2 learners have no representation of property $x$ in their interlanguages, and when required to use property $x$ (in production, comprehension or judgment) they may use it inconsistently and probabilistically. A divergent grammar incorporates a version of the property $x$ in the interlanguage (probably because the L1 grammar has a different instantiation of that same property), but linguistic behavior with respect to the property $x$ in the target grammar is consistently different from that of native speakers. Sorace assumes that both incomplete and divergent representations are due to maturational effects.

While incompleteness (and other versions of non native-like attainment) is an undeniable outcome of late bilingualism, it is questionable whether this outcome is only due to the existence of a critical period, as has often been maintained. Specifically, I argue and demonstrate in this book that incompleteness is also a possible feature of early bilingual grammars – both L1 and L2 – and of a language acquired within the critical period. Fossilization in one of the languages (and possibly even in both) is likely when rich input in the language becomes reduced or is completely interrupted before the closure of the critical period. This is typically the case of immigrant children and adults who begin to use their family language less as they embrace their new L2-speaking society. In this particular sociolinguistic situation, the family language is the minority language and the host country language the majority language. Very often, the L1 (family, heritage or ethnic community language) remains the home language, while the children are educated in the L2 – the majority language. Adults also learn the L2 to different degrees to become fully functional members in the new society.
In my view, incomplete L1 acquisition and L1 attrition are specific cases of language loss across generations. What I broadly refer to as incomplete acquisition (for lack of a better term), is a mature linguistic state, the outcome of language acquisition that is not complete or attrition in childhood. Incomplete L1 acquisition occurs in childhood when, for different reasons, some specific properties of the language do not have a chance to reach age-appropriate levels of proficiency after intense exposure to the L2 begins. In the bilingual cases I discuss in this book, incomplete acquisition which started in childhood persists well into adulthood. Although L1 attrition can also occur in childhood, I consider attrition as the loss of a given property $y$ of the language after property $y$ was mastered with native-speaker level of accuracy and remained stable for a while, as in adults. It is important to clarify that attrition and incomplete acquisition in childhood are not mutually exclusive, since both processes can occur simultaneously or sequentially for different grammatical properties. For example, a child of a given age can exhibit incomplete acquisition of property A if the property was present in the input, emerged in the linguistic competence of the child, and became somewhat productive but was never fully mastered by that age, while at the same time, property B (also present with some frequency in the input) may have undergone attrition, if property B was fully mastered at an earlier age but is either produced/understood with a high degree of error or is not present at all at the current age. And one can also imagine that property A was incompletely acquired (not fully mastered) at age 4, for instance, but produced/understood with much higher error rates or not present at all a few months later. That is, since linguistic competence is apparently fragile before a certain age in childhood, we can also conceive of attrition and regression of an incompletely acquired property. There are also cases when a child may not develop a certain grammatical form because that form is simply not present in the input the child is exposed to. This may be common in situations when monolingual children acquire a variety at home and another one at school, but if bilingual children do not receive schooling in the standard language, they will also end up with incomplete or no knowledge of some properties of the adult grammar in educated speakers. Hence, to reiterate,

10. The best way to tease apart all these processes is by conducting longitudinal studies of children, some of which I discuss in Chapter 5. When we deal with adults who have incomplete knowledge of their L1, as in Chapters 6 and 7, it is impossible to determine whether the incomplete acquisition these heritage speakers manifest in adulthood is the result of one or all of these processes in childhood.

11. For examples of this situation see current work on language change and native speaker competence in Brazilian Portuguese (Kato, Cyrino & Corrêa, in press; Pires 2005; Pires & Rothman, in press; Rothman 2007).
incomplete acquisition occurs primarily in child bilingualism (simultaneous or sequential depending on how early or late a given structure is typically acquired in childhood), while attrition can occur in both child and adult bilingualism – if it can be shown empirically that the property in question existed and has been mastered at an earlier stage. In summary, the weaker language of adult bilinguals can be the result of developing or interrupted L2 acquisition, as in adult L2 learners, or of both L1 attrition and incomplete L1 acquisition, as in many bilinguals who speak a minority language.

It is true that child L2 learners are capable of attaining full linguistic competence in their L2 when they become adults; what remains an open question is whether they are also capable of maintaining full competence in their L1 or family language. Throughout this book, I show how degree of incompleteness and L1 attrition in bilinguals are inversely related to age of acquisition and onset of bilingualism, although age alone cannot be the only factor responsible for these outcomes. I argue that the critical period is highly relevant when it comes to L1 maintenance and loss as well.

In essence, I will demonstrate that there is a tradeoff in the linguistic competence of maintaining two languages, as has been recognized by other researchers in the field of bilingualism (Cook 2003; Flege 1999; Grosjean 1998). Granted that late L2 learners are less likely than early L2 learners to acquire complete native-like linguistic competence and overall proficiency in the L2, they are at the same time, very likely to maintain full linguistic competence and proficiency in their L1. Conversely, while child second language learners may be more likely to attain native-like proficiency in the L2 as adults, they are very likely to lose linguistic ability in their first language, even to the extent of becoming monolingual in the L2. Many late bilinguals are able to maintain a high level of bilingualism. As with L2 acquisition, socio-affective factors like motivation, language identity, education, and peer pressure play a significant role in language maintenance and loss in children, but less so in adults.

5. Organization of the book

The heart of this book is the discussion of incomplete acquisition in adult early bilinguals (heritage speakers) and how their linguistic competence compares to that of adult L2 learners, the focus of Chapters 6, 7 and 8. To understand the linguistic competence of this group, it is important to first contextualize it within L2 acquisition and early bilingualism from childhood to adulthood. Therefore, Chapter 2 and Chapter 3 are foundational: they set the stage to frame, and eventually compare, the linguistic characteristics of L2 learners with those of adult heritage
speakers who have undergone attrition and incomplete acquisition in childhood. Chapter 2 discusses key features of incomplete ultimate attainment in adult L2 acquisition, cases like Kevin and Carolina, and samples the empirical evidence in favor of the Critical Period Hypothesis for L2 acquisition. This chapter ends with an extension of the Critical Period Hypothesis for L1 attrition, which I formulate in two hypotheses: one contrasting child and adult attrition, the other attrition in simultaneous and sequential bilingualism in childhood. Chapter 3 examines the flip side of the L2 acquisition issue: the potential language loss or L1 attrition in first generation immigrants who are late learners, very proficient in the L2, and have been living in the L2 environment for an extended period of time, like Francesco. By focusing on adults, these two chapters illustrate that just as it might be difficult to master a second language like a native speaker after a certain age, it is also highly implausible for an adult to lose his first language significantly. Because this book traces L1 attrition from childhood to adulthood, I suggest that the effects of L1 attrition in a variety of grammatical areas are really minor to negligible in adult late bilinguals, as opposed to the more dramatic effects language attrition or incomplete acquisition can have in children (early bilinguals).

But we cannot understand the processes leading to incomplete acquisition in the adult early bilinguals discussed in Chapters 6 and 7 without examining closely what happens in childhood. Therefore, Chapter 4 and Chapter 5 trace early bilingualism from childhood to adulthood, discussing research on bilinguals like Kristi, Elena, Carlos, Alicia and Beatriz. Chapter 4 presents an in-depth characterization of early bilingual L1 acquisition and incomplete acquisition in language minority-speaking children (typically second generation immigrants). This chapter also introduces the Weaker Language as L1 Hypothesis, which I defend in the rest of the book. Chapter 5 examines heritage language maintenance and loss throughout the elementary school years, and points to middle childhood as a significant age for linguistic maturity. These two chapters show how childhood is a very vulnerable time for both L2 acquisition and L1 loss, and how children are more reactive to fluctuations in input than the adults discussed in Chapters 2 and 3. The studies discussed in these chapters also provide support for the hypothesis that L1 attrition is likely to be more severe in simultaneous than in sequential bilinguals. Because it is difficult to reconstruct the linguistic past of adult early bilinguals by relying on self-reports, these two chapters are crucial to understand the long-term effects of incomplete acquisition and attrition in childhood, the specific focus of Chapter 6.

Incorporating results of my recent research on this topic, Chapters 6 and 7 discuss incomplete knowledge of the L1 in a variety of grammatical areas. Chapter 6 focuses on adult heritage speakers only, and stresses how incomplete acquisition leads to different degrees of proficiency in the heritage language, with retention of