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**PREDICITING EARLY BILINGUAL DEVELOPMENT: TOWARDS A
PROBABILISTIC MODEL OF ANALYSIS**

by

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**A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Romance Languages and Literatures: Romance Linguistics)
in The University of Michigan
2002**

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DEDICATION

To my dear husband Jörg Büscher and to the future bilinguals in our lives.

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CHAPTER 1

INTRODUCTION

The goal of the current study is to advance an explanatory and predictive model of bilingual development and language choice in a planned bilingualism setting, i.e. in very young children exposed to two languages in the home. The approach is multidisciplinary insofar as it addresses the two main aspects of language differentiation: competence, i.e. representation of the speaker's grammatical knowledge, and performance, explicitly using language appropriately according to interlocutor and context of conversation. By way of systematic empirically-based analysis, this study attempts to shed light on the complex interaction of variables involved in the attainment of two languages by children, as well as characterize the influencing factors on differential language use and acquisition in the bilingual. The model of bilingual development put forward aims at predicting whether children receiving dual input have availability of language choice; namely, to what extent they possess knowledge of two languages and are able to apply it appropriately in conversation (see Nicoladis & Genesee 1997).

The concept of *bilingualism* is multifaceted. With respect to the setting of the speech community, two main types of bilingualism can be distinguished, depending on social circumstances and the input conditions: societal (the state of a linguistic community in which two languages are used) and individual (based on a personal level without linguistic support from the society). Hamers (1981) coined the term *bilinguality* to describe the psychological state of an individual who has access to more than one language of communication. Within the psychological dimensions of bilinguality, several classifications are made (see Hamers & Blanc 2000: 26 for an overview). In relation to

competence in the two languages, the literature differentiates between balanced (where an equivalent level of competence is reached in both languages) and dominant bilinguals (where competence in one language is superior to competence in the other). Three categories are set apart according to age of acquisition: child, adolescent and adult bilingualism.

While there has been an increasing amount of formal research on child language acquisition, an abundance of work in this area centers on monolingual children, and particularly English-language development. Actually, Slobin (1971) first advocated the study of bilingual acquisition as a promising means for investigating theoretical constructs of language uniformities, since the number of variables related to social and cognitive factors are more easily controlled when the subject is one person with two grammars, rather than two distinct individuals (Satterfield 1995: 259). De Houwer (1987: 53) argues that the bilingual child is the ideal subject in the investigation of the relative impact of language-specific versus universal factors in acquisition.

The question of how children acquire natural language, i.e., in which manner *nature* (biological endowment) and *nurture* (society) are combined to bring about monolingualism or bilingualism in the child, has thus far not been adequately explained by the acquisition models in their current instantiations, for instance, the *modularity matching model* (Crain & Wexler 1999) and the *competition model* (MacWhinney 1987) among others. The overarching problem for bilingual acquisition is that the theories and methodologies proposed are not in accord as to how bilingual language knowledge is represented and processed in the bilingual mind, and which measurements are to be applied in the assessment of bilingual competence.

The focus of this work is early bilingualism, specifically, the simultaneous exposure to two languages from birth. The term *infant bilingualism* has been frequently used in the literature to define the process of acquisition of two languages in early childhood (see Lanza 1997). Due to its etymological origin, from Latin *infans* ('unable to speak'), this expression is considered more adequate for characterizing pre-production linguistic states and is purposely avoided in the current study, which essentially focuses on the speech of small children at the onset of grammar production, during the two-word stage (approximately from age 2;0 onwards). The investigation concentrates on how very young bilinguals represent the knowledge of their two languages and use it in conversation according to context and interlocutor. Specifically, an explanatory account of bilingual development integrating these two aspects of language differentiation is put forward with the aim of providing an instrument to assess and predict the degree of bilingual competence and appropriateness of behavior in performance, based on the child's linguistic background.

The model of bilingual development in question is presented in two interrelated components: 1) a theoretical model of the representation of bilingual knowledge in the mind, which considers language acquisition as a dynamic modular process (only visible in performance); and 2) an analytical tool to predict the grade of bilingual development (i.e., availability of language choice in competence and use) in a subject under specific environmental conditions, which includes *mixing* behavior (alternation of two codes in a single unit of discourse). In brief, the model proposed estimates to what extent a bilingual child exposed to two languages in a family setting can be competent in both of the input languages, and is able to use them appropriately in conversations with the parents. In this

view, issues pertaining to the field of Psycholinguistics and Sociolinguistics (competence and performance) are examined jointly and comprised in the same analysis.

Research on bilingual acquisition poses numerous methodological challenges. Foremost, although it is generally accepted that a bilingual is not the sum of two monolinguals, an accurate measurement of bilingual competence has proved difficult to reliably gauge across speakers and social situation, despite the efforts of several notable instruments; for instance, comparative measures for vocabulary (Pearson, Fernandez & Oller 1993); measures to examine the internalized system of grammatical knowledge (cloze test by Oller 1979); measures of bilingual specificity, to correlate the degree of balance of bilinguals with a high level of competence in rule-governed code-switching (Poplack 1980); measures of cognitive correlates of bilinguality (Peal & Lambert's 1962 classic study of cognitive differences between monolinguals and bilinguals), etc. (see Hamers & Blanc 2000: 33-49 for a complete review).

Problems relating to bilingual measurements are more acute for emergent bilingualism in the early phases of linguistic development. With respect to age and order of acquisition, no conclusive evidence has been provided to demonstrate to what point in the development can bilinguality be considered simultaneous or sequential, and which circumstances make the difference between these characterizations significant for bilingual development. In other words, the question is what are the implications that the simultaneous or the consecutive exposure to dual input has for language development, and to what extent can both languages of exposure be maintained in the bilingual child over time. This issue is closely linked to the distinction of balanced versus dominant bilinguality in very young speakers.

In order to determine the relationship between the two languages (or linguistic systems) in a bilingual child, it is necessary to define clearly what constitutes a “system”. The characterization of the term *system* in bilingual acquisition is the origin of a long-standing debate in the literature about whether a very young bilingual possesses one or two systems at the onset of grammatical production. Closely related to the contended concept of system, is the difference between *language* and *code* of communication. In the current study, it is understood that (a) mature grammatical system(s) result(s) upon attainment of a threshold of development inside linguistic modules (phonology, morphology, syntax and the lexicon). Therefore, such (a) complete system(s) is/are not accessible to a very young speaker. One or more languages in the process of acquisition are in a state of constant development. A code is, accordingly, regarded as a language at a certain state of development.

A child exposed to input from two languages may acquire adequate knowledge of two codes and thus have availability of language choice (specifically, in the context of emergent bilinguality, a choice of codes). Language choice with respect to early bilingual acquisition is conceived of as the availability of two codes, namely, possessing both adequate grammatical knowledge and the ability to produce speech appropriately in conversation (with respect to the interlocutor and the context). By using language “appropriately” (or within the norm) it is understood that the child complies with the choice of language of the interlocutor (i.e., parent) and with the language context (i.e., the language that is used in a conversation with a particular interlocutor). Accordingly, from the perspective of early linguistic acquisition *bilinguality* would be the state of a child who has access to more than one linguistic code at one particular moment during the

process of bilingual development. In line with use in the literature, the terms bilinguality and bilingualism are employed with little distinction in the current work. A conceptual difference is considered between early bilingualism, i.e., the state of incipient bilingual knowledge and how it is applied in performance (“developing” bilinguality), and a “mature” state of established bilinguality/bilingualism in an individual. The degree of access to the two codes in the bilingual child will depend on a series of factors along psychological and sociological dimensions that need to be defined in the investigation of child bilingualism.

With respect to input conditions, it is generally accepted that different patterns of exposure in the context of a linguistic community, and in the home through parental strategies, bring about diverse results in the configuration of the child’s bilingual status. Failing to provide a particularly detailed account of the methods employed in collecting and analyzing bilingual data gives rise to ambiguous results and interpretations. Moreover, some features of child speech are indiscernible through observation. For example, many instances of mixing phenomena, such as introducing a lexical item from language B in an utterance in language A, are not clearly attributable to a deficiency in linguistic competence or to a particular speaker’s intention, especially in very young children. Consequently, classifying language alternation instances as *code-mixing* versus *code-switching* versus *borrowing* in speakers developing early bilingual abilities is problematic. The current study addresses these issues and attempts to provide a point of departure to solve the existing methodological problems.

The type of bilinguality a child develops is also determined in the sociocultural environment by the relative status of the two languages of exposure. If one of the

languages is devaluated in the wider linguistic community, its development may be delayed in comparison to the other that is socially valued. The circumstances under which a child becomes bilingual depend not only on the societal language, but also on the patterns of language use in the home with the primary caregivers, in particular more intensely during the first years of their lives (Hamers & Blanc 2000: 29).

The focus of the present work is simultaneous child bilingual acquisition in the family as an individual choice on the part of the parents. The term *planned* or *élite* bilingualism (Harding and Riley 1986, Lanza 1997) is used in the literature to designate bilingualism as a consequence of a parental effort to teach and maintain two languages in the child. Children growing up in a bilingual family, that is, exposed since early infancy to two languages at the same time from their main caregivers, are potentially able to become competent bilinguals. Many studies in the literature (such as De Houwer 1990, Döpke 1992, Lanza 1997, Deuchar & Quay 2000) suggest that the degree of bilingual success depends on factors such as parental consistency of language use, amount of exposure, social support, etc., but so far no formal analysis to assess which factors determine child bilingualism has been carried out and even less no attempt at developing a model of prediction has been made. In the current study, the conditions, amount, and patterns of exposure to input from two languages which determine the kind of bilingual the child will become are measured, classified and evaluated with respect to competence and performance dimensions. Linguistic knowledge in both languages and appropriateness of response to input in conversation are assessed in bilingual subjects. The results from this multidimensional analysis yield a series of conditions under which a

child, exposed on a regular basis to two languages in the home, is likely to develop into a productive balanced bilingual.

The research methodology applied to empirically build the explanatory model is based on naturalistic data from 6 subjects, on average between 2;0 and 3;0 years of age, exposed simultaneously to two languages (English and Spanish) from parental input in the home on a daily basis. The participant families live in monolingual areas of the United States without support for the minority language. Data were collected longitudinally by means of parental audio-recordings and analyzed systematically integrating competence and performance elements. The results from the analysis were further compared to other bilingual child data for model verification.

The present study provides a multidisciplinary tool to predict the degree of bilingualism in children acquiring two languages under the circumstances described above. The degree of exposure to each language from parental input in the home may vary greatly, creating different bilingual profiles across children. Besides addressing general issues in the study of language acquisition and bilingualism, the current investigation sheds light on interesting implications of child bilingualism that raise questions for further research in the field.

This work is divided into eight chapters. Chapter 2 overviews background literature on previous research and existing theoretical and methodological approaches pertaining to the study of bilingual acquisition. In chapter 3, I introduce a model of modular bilingual language development with regard to representation of emerging linguistic knowledge. Chapter 4 presents the methodology applied in the current study,

and elucidates the theoretical questions posed and the procedures of data collection. In chapter 5 the process of data analysis is described in detail through a series of dependent and independent variables. Comprehensive results from the data analysis and statistical testing of the variables examined are tabulated and commented on in chapter 6. Chapter 7 analyzes further data from a bilingual child external to this study, in order to validate the model of bilingual prediction resultant from the data analysis implementation. Finally, chapter 8 summarizes the major findings in this study and discusses the important consequences of these results for the field of child bilingual acquisition.

CHAPTER 2

BILINGUAL ACQUISITION: THEORETICAL AND METHODOLOGICAL APPROACHES

As mentioned in the introduction, the exploration of bilingual acquisition is interdisciplinary and multi-faceted. In this chapter, I review standard language acquisition theories and recent research on bilingual early development. To begin, section 2.1 outlines key assumptions and long-standing hypotheses concerning general language acquisition. This discussion will set the theoretical frameworks for the study and further elucidate the perspective to be taken on bilingual development. Section 2.2 presents the spectrum of methodological perspectives implemented in recent studies on the simultaneous acquisition of two codes from birth. In 2.3, I revisit the debate on one- or two-systems of bilingual knowledge representation, continuing with an examination of related issues on bilingual language use in section 4. Finally in 2.5, the conventional methodologies and novel research trends are reviewed with an eye toward unifying bilingual acquisition approaches by accommodating aspects of both competence and performance within the same analysis.

2.1 Development of Linguistic Competence

This section overviews fundamental claims concerning the nature of language and language development together with language acquisition theories which establish the theoretical background for this study on early bilingualism. Firstly, I take as a starting point the theory of Universal Grammar and Principles and Parameters within the framework of generative grammar and review general issues on child language acquisition that apply to both monolinguals and bilinguals.

2.1.1 Assumptions on the Biological Basis of Language

The core question in child language development research is how children acquire natural language. The linguistic principles of *Universal Grammar* (UG), which are specific to grammar formation, establish a theory of the human biological endowment for language, i.e. how the initial state of the brain/mind of the language learner is organized. UG is typified as a component of the language faculty mediated by a set of invariant principles common to all human languages. Crain & Thornton (1998: 9,10) define the *innateness hypothesis*, pinpointing several empirical *hallmarks* (universality, early emergence, and the poverty of the stimulus) that indicate that the initial properties of linguistic knowledge are innately specified. If a linguistic principle is part of the human biological capacity for language development, it will be expected to appear in learners of any natural language. Moreover, certain aspects of linguistic knowledge may become active once a specific stage in development is reached, in the same way as some properties of physical development are genetically scheduled. Finally, one characteristic of child language growth is that a property is manifest in the absence of decisive evidence from the environment. If children come to possess more language knowledge than they have received from limited experience (i.e., *Plato's problem*; see Chomsky 1986), it is suggested that this knowledge is innately specified.

Empirical evidence from production to demonstrate the innateness of UG principles examines relevant linguistic knowledge by way of *constraints* (linguistic principles that rule a variety of linguistic phenomena). For example, constraints on form such as “structure-dependence” and the “*wanna* contraction” illustrate how learners master the knowledge, acquired in the absence of input, that certain linguistic forms are

prohibited (see Crain 1991 for a detailed account). Likewise, constraints on meaning such as coreference in terms of “Principle C” indicate the knowledge that certain meanings are proscribed. This induces one to consider that such information is not explicitly learned, but rather part of the genetic “blueprint” for language development (cf. Crain & Thornton 1998: 10-28).

Small children become proficient in one or more languages before they are able to use other high-rank cognitive abilities, which suggests not only that language and its capacity have a definite genetic basis, but also that this specific innate capacity is modular in nature. The human capacity for language is the product of a mental organ or faculty, it implies that language is not “learned” per se, but developed under particular environmental conditions, analogous to physical growth (cf. Chomsky 1980 and Fodor 1983). The notion of *linguistic modularity* implies that language properties apply autonomously, in a limited domain. The language faculty operates according to biological principles and mechanisms that are specific to it and not shared with other cognitive modules in the mind. On the other hand, modularity is a controversial hypothesis, as some researchers do not hold with the notion of an autonomous language faculty (Bates & MacWhinney 1982, among others). In contrast, these investigators maintain that language is the product of general learning capacities and part of cognitive development (Bruner 1990).

It is generally considered that in the course of early language development certain linguistic properties are timed according to a genetic schedule, and that children seem to acquire language in a relatively short amount of time with respect to adult language learning. These assumptions lead to hypothesize of the existence of a decisive age-

sensitive period for language acquisition. Lenneberg (1967) proposed the *critical period hypothesis*, which argues for the existence of a phase of neuropsychological maturation in humans, lasting approximately from two years to puberty, during which language acquisition occurs easily and completely on account of exposure to primary linguistic data, in a manner not possible before and after that period. This claim received criticism from Krashen (1973), among others, after it was verified that lateralization occurs at the latest at 5 years of age. Besides, research also showed linguistic competence can also be acquired and improved after puberty (Curtiss 1989). Oyama (1979) favors the notion of a *sensitive* rather than critical period to refer to a developmental stage during which receptivity for language is greater. Johnson & Newport (1989) tested two sensitive period hypotheses: the *exercise* hypothesis, which states that the initial language-learning capacity in humans can be maintained for second language acquisition if exercised, and the *maturational-state* hypothesis, which predicts a decline in language learning ability regardless of whether or not it is exercised. Empirical evidence seems to validate the maturational hypothesis. Nevertheless, maturation can also be explained by factors other than biological ones. MacWhinney (1992) posits that increasing automatization in the L1 makes it difficult to restructure the system with respect to new auditory, articulatory contrasts, etc.

Similarly, the supposition that certain linguistic properties are timed according to a genetic schedule corresponds to Brown's (1970, 1973) pioneering work in psycholinguistics, in which he described the course of development of a first language (English) in three children (Adam, Eve and Sarah). Brown distinguished five stages in the acquisition, coupled with values obtained from his original measurement for morphemic

development, called *mean-length-of-utterance* (MLU). He observed that the order of acquisition of 14 selected (English) morphemes was relatively fixed and constant across his three unacquainted subjects. However, while the order of development comes close to invariance, the rate of development diverges extensively. Each subject reached developmental milestones at a different time, for which age cannot be a relying prognostic factor of acquisition tempo. Notwithstanding this weakness in his measurement, Brown argued that MLU is a legitimate index of the level of development of grammatical morphemes in early development (at least through stage V, when MLU equals 4.00) with predictive power.

The fact that children command certain properties of the adult language even at a very early stage of grammatical competence (e.g., Brown 1973) can be regarded as evidence for a genetically-encoded language faculty. Nevertheless, although all languages are ruled by universal syntactic principles, each particular language possesses its own attributes. This issue will be the object of attention in the following section.

2.1.2 Language Acquisition Theories

In order to ascertain how (a) language is acquired, it is necessary to determine to what extent the properties are language-specific or invariant across languages. Parameter-setting models are applied to explain why clusters of syntactic properties appear to differ across languages. The speaker learns properties that vary cross-linguistically through exposure to some specific linguistic environment. According to the *Principles and Parameters Theory* (P&P), properties shared by all languages are part of UG. Parameters serve to explain cross-linguistic variation. A parameter is a limited set of values (or

hypotheses) which is entertained for a particular linguistic phenomenon. Parameters act as constraints on the way languages diverge, thus reducing the number of hypotheses the child may consider in the course of language acquisition (Crain 1991).

Several opposing models of the language apparatus, in which the interrelations of grammar and the other linguistic (and nonlinguistic) components of cognition involved in language learning and processing are perceived differently, are briefly reviewed next.

The *modularity matching model* (Crain & Wexler 1999) starts from the assumption that the human language-processing system is modular and argues that the child's language processing system is fundamentally equivalent to that of an adult. They presuppose that children have access to both UG as a system of constraints on potential grammars as well as a universal parser for language processing, just as adults do. This model contrasts with the *competing factors model*, under which a range of variables (including linguistic knowledge, memory, etc.) "compete" in determining linguistic behavior. Language is regarded as a large set of "tendencies", so that language knowledge is considered to be a certain statistical tendency in behavior. Grammar principles can be superseded by "performance factors" extraneous to UG, a fact that renders this model unsuitable for competence-based theories of language acquisition within the generative framework, according to the modularity matching model supporters. They state that experience merely allows the learner to identify and set the parameters provided by UG.

Alternative models to the P&P approach include the *input matching model*, which disregards innately specified linguistic knowledge as the foundation of children's grammatical hypotheses maintaining that the hypotheses are attached to primary linguistic data. Language learning is triggered by general-purpose learning algorithms in

addition to other cognitive processes. One example of input matching is the *competition model* (MacWhinney 1987 and other), according to which a learner relies on “cues” available in the environment.

This first section described the nature of the acquisition process from the perspective of the language faculty being innately specified. In summary, language research aims at explaining children’s rapid mastery of a complex linguistic behavior. Partly predetermined knowledge seems to guide children in their language acquisition path. To a great extent, this knowledge is encoded in constraints that are probably innate since they appear universally and early in development, when they could not have been learned from experience.

2.1.3 “The Bilingual Problem”

While it is often posited that over 50% of the world's speakers are bilingual (Grosjean 1982), the bulk of analyses on the nature of linguistic knowledge and building a grammatical system are discussed in contemporary linguistic theory from a monolingual perspective. Chomsky's (1965) notion of the ideal speaker-listener in a homogeneous speech community contrasts with Jakobson's (1953) observation that bilingualism is the fundamental problem of linguistics, since individuals (under normal circumstances) have the capacity to acquire more than one grammar at a time. It becomes necessary to expand the research paradigm to include the majority of the world’s speakers. The question arises as how to achieve a means to work within some of the correct postulations of P&P and to expand the theory to bilinguals. The overarching problem is that none of the acquisition models described above, in their current

instantiations, can adequately explain the bilingual child's development. One reason is that P&P formulations focus on the biological context. Accordingly, "nature" gives the child for the most part what is needed to acquire language, whereas the bilingual child is additionally confronting "nurture" or social contexts that will bring about bilingualism. On more technical points, conventional parameter-setting accounts are not geared to accommodate the requirements of dual settings (see Satterfield 1999 for a notable exception), nor does a basic modularity approach fully explain how the bilingual child might organize the specific units for more than one grammar. Furthermore, it is not yet known whether a biologically sensitive period is merely a sufficient, but perhaps not a necessary condition. Although neurological maturation is one factor responsible for slower acquisition of a L2 at a later moment, the learning task for children can be facilitated by cognitive, experiential and social factors, as Hamers & Blanc (2000) suggest. Similarly, a genetically fixed schedule in the course of language acquisition as Brown (1973) postulates for English as L1, needs to be further contrasted with linguistic development in other languages. Although a relatively predetermined order of acquisition can be detected in other languages (see Appendix H), developmental measurements, such as MLU as designed by Brown, which are meant as global and formal indicators, are intrinsically problematic in their application to languages other than English.

Upon agreement that there is a line of development of linguistic competence in first language acquisition, and considering restriction factors such as input and age of exposure to the native language(s), standard (monolingual) acquisition constructs posit problems in the study of bilingual development. Standard theories explain how children come to one grammar only, when in reality children possess the capacity to acquire more

than one language, either as L1 or as L2. It becomes necessary to examine issues relating to the setting and input conditions under which particular cases of bilingual development take place. Since the current study deals with the acquisition of two languages simultaneously in a family environment, the next section focuses predominantly on this specific type of bilingual development.

2.2 Bilingual Acquisition

The most obvious difference between bilinguals and monolinguals is that the former are exposed to input from more than one language in such a way that they acquire multiple grammars. Children in active contact with two languages since early infancy are potentially able to construct two grammatical systems and thus become competent bilinguals. It is generally accepted in the literature that several factors such as setting, age and time, quantity and quality of exposure shape the patterns of childhood bilingualism. This section discusses major issues on the particular character of bilingual acquisition in the child.

2.2.1 Stages in Bilingual Language Development

The sequence of language development in bilingual children displays the same features as those found in monolingual speech: babbling, one-word (or holophrastic), two-word and multi-word stages. Meisel (1986) finds no qualitative difference between bilinguals and monolinguals with respect to the underlying principles and mechanisms of language development. The order of phonological and morphosyntactic development reported in Brown (1973) is claimed to be more or less identical in children acquiring one

or more languages. Regardless of apparent parallelisms, the task of the bilingual is more complex since implicit strategies need to be implemented to deal with two linguistic systems. An overview of bilingual development according to different linguistic components (phonology, lexicon and morphosyntax) is included in chapter 3, when an original model of bilingual language development is presented.

2.2.2 Order of Acquisition: Simultaneous or Sequential

Bilingual language acquisition is the result of continued and regular exposure to more than one language from very early on. Factors such as age at the onset of exposure and amount of input bring about dissimilarities in the development among bilinguals. The terms *simultaneous* and *sequential* bilingualism are commonly used in the literature to classify different patterns of child bilingualism with respect to the order of acquisition. According to McLaughlin (1978), the process of bilingual language acquisition in children exposed to two languages at any point in time before the age of three is considered simultaneous. On the other hand, Vihman and McLaughlin (1982) consider cognition and language development as the criteria to determine bilingualism, rather than the age of the child, based on the differences in the amount and pace at which children acquire a first language. Although the age criterion may be significant, the degree of bilingualism ultimately achieved is not associated with the order of acquisition of the languages, but with “psychosocial factors” (e.g., the amount of exposure and context of use), which ultimately determine the magnitude and length of a child’s bilingualism (see Grosjean 1982). However, De Houwer (1990, 1995) advances a restrictive age limit in order to establish the difference between simultaneous and successive acquisition of two

languages. She uses Meisel's (1990) term *Bilingual First Language Acquisition* (BFLA) exclusively when the child's first exposure to both languages occurs within a week of each other, and contingent upon the exposure to both languages, which must be practically constant on a daily basis. The term *Bilingual Second Language Acquisition* (BSLA), as coined by De Houwer, designates those cases of exposure to a second language between the ages of one month to 24 months. This author argues for empirical studies of children exposed to two languages from birth to be compared with learning operations in children exposed to a second language after age one.

Bhatia & Ritchie (1999) find Meisel's and De Houwer's suggested terminology problematic. Specifically, they find a potential ambiguity in the term Bilingual Second Language, as it occurs in adults. Bhatia & Ritchie therefore propose *Child First Language(s)* (CFL) and *Child Second Language* (CSL), respectively, as a way to clarifying the terms. Furthermore, they identify stages of child linguistic development rather than age as a distinguishing criterion for simultaneous acquisition from sequential language development. Specifically, full exposure to both languages by the one-word stage is posited as the decisive factor for simultaneous acquisition. Future research may offer a firmer empirical basis to settle this question.

A key factor in ascertaining the rates of bilingual development, given simultaneous (CFL) or successive (CSL) acquisition, appears to be *language dominance* (the relationship between the two languages in a bilingual at a specific moment in the development of bilingual speech). This factor can be assessed by examining the amount of exposure to each language. Language dominance is likely to depend on two aspects: a) the amount and quality of input (rather than the order of the first exposure) throughout

the period of acquisition; and b) the communicative needs the speaker may have. The ultimate criterion to determine if a child is acquiring two codes as a first language depends on whether the child is exposed to and is using both languages on a regular (daily) basis. In my view, the question is not so much when the time of first exposure was, but rather whether children can be considered competent in two languages before they complete their process of constructing their linguistic system(s). The notion of language dominance is an attempt to explain this asymmetry between the two languages in a bilingual and deserves individual attention.

2.2.3 Language Dominance

The concept of language dominance was used in the early literature on bilingualism as a measurement for bilingual proficiency (Macnamara 1967, 1969).¹ Bilingual speakers regarded as more proficient in one language than the other were identified as “dominant” in that language, whereas those considered as equally proficient in both languages were considered as “balanced bilinguals”. Grosjean (1982: 188-189) raises objections to Macnamara’s proficiency tests and proposes the examination of the circumstances that may influence language dominance. He provides two reasons against the proficiency tests, the first being the difficulty of internalizing and producing specific linguistic structures in one of the languages; and the second, that the child “may be exposed to or may need one language more than the other”. He claims that ultimately dominance in one particular language lies in factors concerned with amount of exposure

¹ Dodson (1981) introduced the concept of *preferred language* to refer to the dominant language of very young developing bilinguals. *Language dominance* is favored here due to its broad acceptance in the literature.

and communicative needs in the “immediate environment”. The consequences of dominance would be, on the one hand, the superior development of the stronger language with respect to grammar, lexicon, etc.; and on the other, the interference and influence the stronger language exerts over the weaker.

De Houwer (1990) points out that children may use different morphosyntactic forms in each of their languages without showing a lack of competence or an inferior level of development in one or the other language. In the framework of a modular approach to the process of language acquisition, in the spirit of Fodor (1983), Chomsky (1986) and Sharwood Smith (1991), it can be implied that the term language dominance does not necessarily need to refer to one language as a whole. Assuming that languages are organized in different modules (phonetic, morphological, syntactic and lexical), these different elements come into play in the process of constructing a linguistic system. The assessment of language dominance can be related to each module independently. Section 2.4 below re-examines the issue of language dominance as a factor determining language choice in actual language use.

Next, the formal relationship between the two languages in a bilingual child will be discussed under the issue of how language knowledge is represented and processed in the bilingual mind.

2.3 Representation and Processing of Bilingual Knowledge

As stated above, in the course of first language acquisition the young child constructs a system of formal elements including subsystems such as phonology, morphology and syntax. Moreover, a number of mechanisms of language processing play

a role in the formation of language ability. The current section discusses first key aspects of bilingual language representation and reviews the question of to what extent a young bilingual speaker develops two separate linguistic systems from the onset of production. Then some aspects of bilingual language processing are briefly outlined, in which a distinction is made between developmental and knowledge processing. The claim that crosslinguistic influence may be a (real-time) phenomenon in performance is put forward. Finally, I argue that models of bilingual processing need to include all aspects of competence and performance involved in bilingual acquisition.

2.3.1 The Two Linguistic Systems in a Bilingual Child

A central focus of attention in the field of bilingual language acquisition in the last decades has been whether, at the onset of early development, the representation of emerging linguistic knowledge behind bilingual competence is best described as a single system accommodating both grammars which become gradually separated or rather as two independent systems containing the particular grammars.

The theory that claims that bilingual children start off with one system that gradually unfolds into two over time is called the *Unitary Language Hypothesis*. Its proponents, Volterra and Taeschner's (1978) advanced a three-stage model of early bilingual development. During *Stage I* the child possesses a single lexical system composed of lexical items from both languages that lacks translation equivalents (semantically corresponding lexical items). *Stage II* represents the slow separation of the lexicons of the two language systems, but the syntax remains in a state of fusion. Finally, the two systems become separated in terms of vocabulary and syntax in *Stage III*. Swain

(1972), Redlinger and Park (1980), Vihman (1982, 1985, 1986) and others subscribe to this view, which is depicted in figure 2.1.

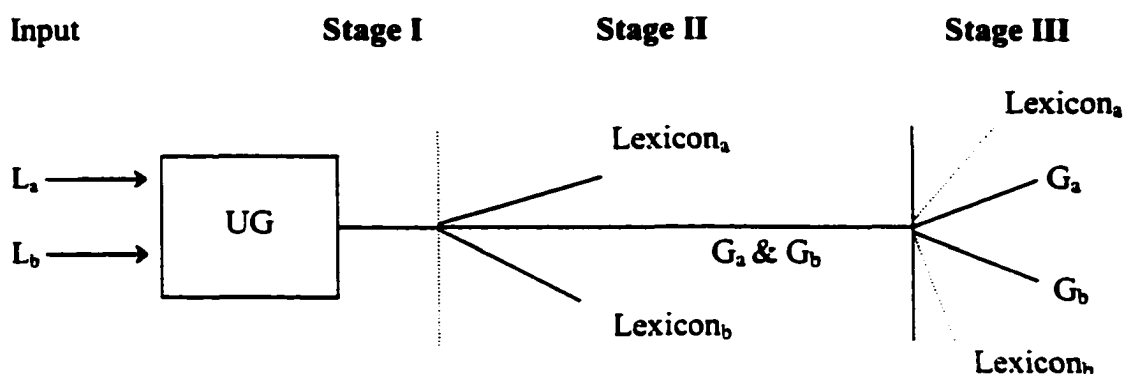


Figure 2.1 The Unitary System Hypothesis

Mixed utterances are perceived as the inability of very young bilinguals to differentiate languages as they try to form a single system out of the two languages they are exposed to. The evidence used to sustain this claim such as reports from lists of words of two one-year-old subjects using their two languages indiscriminately as well as language mixing, are construed as inconclusive and methodologically without motivation by detractors such as Meisel (1989) and De Houwer (1995). The evidence upon which Volterra & Taeschner base their assumptions ultimately depends on the lack of particular forms instead of on their occurrence, and it is not related to the sociolinguistic context in which these forms appear (see Genesee 1989 and Quay 1993). De Houwer (1995) questions the assumption that if a child does not use equivalents (in the two languages acquired), this necessarily means that s/he possesses only one system. Lack of equivalents can be related to factors, such as a gap in the input, which are not an indication whether the child is developing one or two linguistic systems. In conclusion, it

appears that making assumptions about the general character of bilingual acquisition in very young children on the basis of the lexicon alone cannot be reliable.

Supporters of the *Dual System Hypothesis* claim that bilingual children are able from a very early age to differentiate between the two linguistic codes. Studies from Padilla and Liebman (1975), Bergman (1976), De Houwer (1987, 1990), Meisel (1989, 1995), and Nicoladis (1995) among others focus on the capability children have of developing two separate systems from the beginning. Meisel argues that mixing in very young bilingual children is due to a “deficiency” in their pragmatic competence and suggests that when bilingual children start to use syntactic mechanisms of expression they are able to discriminate between two systems, rather than merely possessing semantic and pragmatic means that are common to both bilinguals and monolinguals. The two-system hypothesis is diagrammatically represented in Figure 2.2.

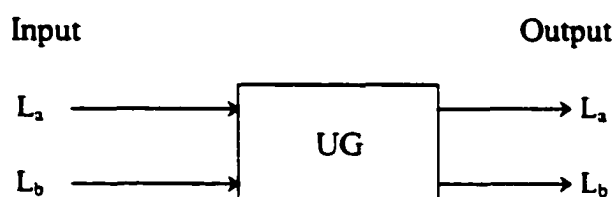


Figure 2.2 The Dual System Hypothesis

Followers of the Dual System Hypothesis based their conclusions on individual linguistic aspects pertaining to language acquisition. For instance, De Houwer’s (1990) study focuses on morphosyntactic development exclusively and Genesee (1989) considers language dominance as the factor that determines the shape of linguistic representation in the bilingual. Moreover, Meisel (1989, 1995) argues that deficiencies in

pragmatic competence may falsely indicate a lack of system separation. Although current research tends to sustain the dual system hypothesis, the matter is far from resolved. Chapter 3 revisits this question proposing that both hypotheses are strongly linked and demonstrating that formal modular categorization allows for a single developmental architecture with early separated grammatical representations. Closely related to the representation of bilingual knowledge is the manner in which this knowledge is processed. The next section outlines briefly some aspects of language processing in bilinguals.

2.3.2 Bilingual Language Processing

Models of bilingual processing need to account for the ways in which bilinguals differ from monolinguals in language perception and production. The term *language processing*, used here to refer to the way bilinguals operate with language data, denotes two different aspects. First, *developmental processing*, is understood as the intake and processing of relevant input information from the environment in the development of knowledge representations. Second, *knowledge processing*, acts as an on-line control, once the learner has the available knowledge representations. These representations need to be processed according to the different applications the learners give their language system at a particular moment. In simultaneous bilingual acquisition, processing input for the development of competence needs to be modular in the sense that “the linguistic subsystems that, by hypothesis, obtain for one language must obtain for the other language as well” (Sharwood Smith 1991: 10-16). It is suggested that the knowledge of L1 and L2 is not strictly separated, and that their output can be combined during

performance, due to concurrent activation in production (Meisel 1989, Sharwood Smith 1986).

In addition, Grosjean (1985, 1997, 1998, 2001) proposes the notion of *bilingual modes* to explain bilingual language processing and specifically mixed language behavior. He defines language mode as a state of activation of one code and language processing mechanisms in a bilingual speaker at a particular moment. In everyday situations bilinguals find themselves in a range of language modes that correspond to positions in a monolingual-bilingual continuum. The author applies his language mode hypothesis to explicate a series of linguistic phenomena in the bilingual such as delay in lexical decision and mixing. In a bilingual language mode, both languages are active and the bilingual can produce mixed utterances at the same rate as monolingual speech. In some cases, different language modes can be attributed to the input and output (as separate) systems in bilingual processing. Evidently, the need for general models of bilingual language representation and processing in the literature is manifest. Grosjean (1998) calls for models that contain all the necessary elements explicitly in order to be tested empirically, and that account for individuality in the speakers. Models of bilingual knowledge representation and processing need to account for all aspects involved in bilingual acquisition, namely, competence and performance issues, including contextual information.

This section has elucidated some major points concerning bilingual knowledge and how it is represented and processed. The manner in which bilingual competence actuates performance is the next object of attention.

2.4 Bilingual Language Use

Both nature (genetic endowment) and nurture (linguistic input) are responsible for the outcome of the bilingual child. Having already discussed at length the biological component, I turn to the role of external features in bilingual development, especially those related to the particular kind of child bilingual acquisition that is the focus of this study - planned bilingualism in the family. First, I examine aspects of the circumstances of language exposure that shape the type of bilingual acquisition a child experiences; and then describe the specifics of the studies dedicated to bilingual language acquisition in a familial environment. Next I review concisely some classic views on factors determining the speaker's selection of language, and lastly I describe some features of bilingual speech by characterizing different manifestations of mixed language.

2.4.1 Setting and input conditions

A number of external factors, explicitly, "migration, schooling, nationalism and political federalism, intermarriages, urbanization, linguistic plurality in the region, family and community, perception of ethnic languages and bilingualism" (cf. Bhatia and Ritchie (1999:585) can shape the characteristics of the linguistic input the child receives. The specific center of attention in this work is the process of bilingual acquisition within the family (*planned* or *élite* bilingualism, as explained in the introductory chapter) in a monolingual community setting, mainly on account of intermarriages.² Vihman and McLaughlin (1982) identify two basic environments of language exposure, home and community, and three different types of language use: 1) each parent uses one language;

² For child bilingual acquisition in a bilingual community, see, for instance, Lyon (1996).

2) both parents mix languages; and 3) an environment-dependent language use (use of the minority language at home and the community language outside). It is possible to expand the second category to include the common situation in which one of the parent mixes and the other one uses the language of the community.

Romaine (1989: 166-168, 1995: 183-205), following Harding and Riley (1986), proposed a classification of types of childhood bilingualism based on three input factors for language acquisition: 1) the parents' native language(s); 2) the language(s) parents use in interactions with their children; and 3) the language of the community and, by extension, the degree to which the parent's language(s) reflect the language(s) of the community. Based on existing studies in the literature, parental strategies that provide bilingual input to children can be translated into a range of language exposure patterns that may be classified into 6 types of bilingual acquisition in early childhood:

- 1) "one person - one language" (Grammont's Principle) is possible when parents have different native languages and some degree of competence in the other's language;**
- 2) "one language - one environment" is possible when parents have different native languages and speak a non-dominant home language to the child, while one of the parent's native language is that of the community;**
- 3) "non-dominant home language without community support" happens when parents share the same language, which is not that of the community, and speak it to the child;**

- 4) “double non-dominant home language without community support” occurs when each parent has a different native language and speaks it to the child, who is also exposed to a third language, that of the community;
- 5) “non-native parents” is given when parents share the same native language, which is the one of the community, and one of the parents addresses the child in a language that is not her/his native language;
- 6) “mixed languages” take place when both parents (as well as certain sectors of the community) are bilingual, and mix languages when speaking to the child.

Romaine’s categorization of patterns of bilingual exposure at home are not complete and can be expanded to illustrate the full spectrum of bilingual language settings in family environments.³ These types of childhood bilingualism can be further grouped into two basic categories considering the use of the non-dominant language by the parent(s): 1) one language at home and 2) one parent-one language. Both groupings include language mixing by either one or by the two parents. Nonetheless, parents and children can change at one point in time their linguistic behavior and patterns of language use depending on the circumstances, both linguistic and extralinguistic.

These language-use forms correspond to strategies employed by minority families to ensure a balanced input from both languages for the child. Bhatia and Ritchie (1999: 585) expand on this categorization creating four distinctions based on *domain allocation strategies*. This procedure consists of restricting the use of one language to one social agent or setting and the other language to other social situations: 1) one parent-one

³ See Appendix A for an original expanded version of Romaine’s classification.

language; 2) one place-one language; 3) a language-time approach; and 4) a topic-related approach. These circumstances correspond to an “unnatural setting” with respect to those children who receive input from two languages that flows naturally from the community, but it still may be considered as naturalistic acquisition compared to formal language (learning) instruction.

An important issue to consider is the amount of time a child spends with each of the most significant “input carriers”. If, for example, a child’s father is the only input source of a language and spends a very reduced amount of time with the child, it is unlikely that the infant can be exposed on a regular basis to both languages (see De Houwer 1995: 224-225 and Lanza 1997).

Next, I briefly typify the kind of studies that specifically investigate early bilingual development in the home environment, where parental input is the main source of exposure to the minority language.

2.4.2 Bilingual First Language Acquisition in the Home

The 1990s gave rise to an upsurge in research focusing on the simultaneous acquisition of two languages in family settings within (relatively) monolingual communities (De Houwer 1990, Döpke 1992, Köppe 1994, Lanza 1997, Deuchar & Quay 1992, 2000 and others).⁴ These case studies are typically longitudinal investigations of a reduced number of subjects (frequently one), usually carried out as naturalistic observations in the home environment during interactions with parents, other relatives and friends. The relationship between degree of bilingualism and sociolinguistic context

⁴ Appendix B contains a brief comparison of recent case studies across countries and languages.

consistently lies at the core of these investigations, which in turn leads to the discussion of input conditions, parental teaching strategies, phonological, lexical and morphosyntactic development, language mixing, and the like. These studies all describe comparable situations across families and languages of interaction. Similarly, their results concur on the key role of (parental) input in bilingual acquisition and of context as determiner of language choice in children.

2.4.3 Language Choice

As the child accumulates social experience s/he becomes aware of contextual cues which promote the establishment of bilingualism. These prompts can come from the environment or from a person. This section outlines some of the factors determining language choice, emphasizing the importance of contextual issues in the selection of code in child speech production.

A number of classic sociolinguistic studies (Ervin-Tripp 1964, 1968; Gumperz 1964; Fishman 1965, 1972; among others) have brought forth several factors that are likely to cause shift in language variety (in monolingual adults): the participants, the setting, the topic and the function of the interaction. These categories to a large extent may be applied to the study of child bilingualism to predict, in general terms, the children's choice of language. A concise description of some determinants accountable for children's code selection is given next.⁵

⁵ See Hoffmann (1991) for examples of supporting empirical evidence.

- The *participants* engaged in the speech event are a key factor in language choice. Studies of families in which each parent addresses the child in one language claim that children tend to follow the patterns of language exposure used in the home.
- The *setting* (place and situation) influences language selection through socio-psychological factors, i.e. children grasp cues from their environment and react accordingly. As a result, the choice of language outside the home is generally that of the community.
- The *function* or purpose of the interaction determines a choice made with the intention of implying a certain meaning or having a particular effect, which can be, for instance, excluding a participant, quoting, requesting, etc.
- The *topic* of the conversation can be culturally-related and thus be attached to one specific language. The more experiences the child receives, the more s/he will be sensitive to the context of the conversation.
- Finally, the degree of *linguistic competence* the child possesses may constitute the major psycholinguistic motivation for language choice. Speakers may select the language they feel most confident in, or the language that it is available to them.

The concept of *language dominance* mentioned in 2.2 3 above from the perspective of bilingual competence comes into play in the discussion of performance aspects of language selection. Recent attempts to define language dominance consider both production and non-production factors to demarcate dominance. For Petersen (1988), production factors are related to directionality of code-switching, whereas non-production factors include the influence exerted by the language environment on the

child's language use. Lanza (1997) includes as dominance indicators the amount of exposure to each language, the child's choice of language and the parents' evaluation of the children's "stronger" language; and considers phenomena such as grammatical mixing a consequence of dominance. Some authors (Romaine 1995 and Deuchar & Quay 2000) highlight the difficulty of defining the term "dominance" and do not consider it a useful concept in the study of bilingual language acquisition.

To my mind, the concept of dominance is useful as a descriptive tool to illustrate an instance in bilingual language exercise. Language acquisition and language use are dynamic processes, both for monolingual and bilingual speakers. The concept of language dominance can be applied to describe a moment in the development of bilingual speech with respect to the relationship of the two languages in the bilingual. I understand language dominance at both the competence and the performance levels, that is, on the one hand the speaker will have a better command of elements such as the grammar and lexicon in her or his dominant language; and on the other, the speaker will use the more dominant language more often for a variety of reasons, which include psychological (language attitudes) and sociolinguistic factors (language input). I would like to stress the importance of bearing in mind the differences among the dominant language in the community, the language that is dominant in the family and the language that is dominant for the child. The relationships the child maintains with family and community will determine the kind of linguistic input s/he receives. Figure 2.3 illustrates the influences and interaction of input sources for the young child in families where the parents are the main caregivers.

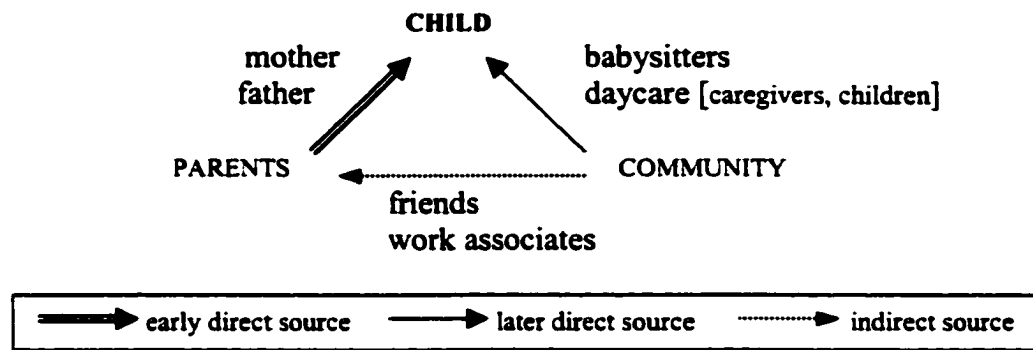


Figure 2.3 Interaction of Linguistic Input Sources

For the young speaker, this is a changing process depending on age and input factors. As the child grows older, her or his contact with the community, and hence, the external world outside the home, expand. Consequently, the relationships in the child's "social network" change. It would seem logical that the more a child is exposed to a language and the more opportunities s/he has to employ it, the more dominant that language may become, with respect to language skills and use. Consequently, there must be a causal relationship between the stronger or weaker language for the family during the first stages of linguistic development in the child in addition to the language of the community at a later point in time, and the child's dominant language. Furthermore, in my opinion the idea of one dominant language (a "one and only" strong language in a speaker) should not be regarded as absolute, and language domains also need to be taken into account to assess the "dominant" language in the speaker. For example, in a monolingual community a child is exposed to a minority language at home but s/he plays with other children in the community language. The child's dominant language of play will be more likely that of the community, but s/he will interact at mealtimes "more naturally" in the family language. In a nutshell, it is suggested that dominance is in a

dynamic relationship with respect to language acquisition and it is related to the quality and quantity of exposure to each language. Additionally, dominance changes according to the speaker's communicative need.

2.4.4 Language Mixing

The role translation equivalents play in determining if the bilingual child is able to tell apart her or his two systems has previously been pointed out. It is generally accepted that if the child produces synonyms, this is a sign that s/he is bilingual. Nevertheless, children's use of mixed speech has raised controversies in the literature. Supporters of the Unitary System Hypothesis deem mixed language as a sign of lack of language differentiation, whereas defenders of the Dual System Hypothesis consider mixing as a response to mixed input or as a question of dominance. The roots of the uncertainty about mixing phenomena in early acquisition lie in the lack of a consensus in telling apart different categories of mixing behavior. This section advances a classification of child language mixing that aims at explaining how differences in mixing phenomena are manifestations of various conditions in the course of bilingual development.

First of all, it is necessary to clarify the difference between the terms language and code. Although used indiscriminately in several contexts (child language meaning code), when referred to child speech the term "code" is used in this work to define a state in the production of a linguistic system during the process of acquisition, whereas "language" is the ideal final (adult) state of the acquired system.

Different proposals have been put forward to categorize child mixing, and particularly due to theoretical and methodological differences, discrepancies in

denominations for the same aspect of language contact phenomena have appeared.

Formal accounts that concentrate on the structure of mixing contrast with explanations derived from linguistic competence issues. Mixing (or language mixing) is employed generically in this work to refer to general language alternation phenomena, i.e. the use of phonological, lexical and morphosyntactic elements from two, or more, languages in the same utterance or stretch of conversation in the speech of young children acquiring two languages simultaneously (see Lanza 1997).⁶ Several categories of mixing can be distinguished according to bilingual ability and speaker's intention. These concepts, which I will elucidate next, refer to contact phenomena taking place in language use and are based on issues of bilingual competence, partly following Meisel's (1989) and Muysken's (2000) terminology:

- *Code-mixing* is the unsystematic combination of elements from each language in the same discourse unit due to a lack of linguistic competence. It is unintentional and ungoverned by constraints.
- *Code-switching* is an intentional (although not necessarily conscious) change of languages (with respect to the base language of the conversation) with a specific communicative purpose (such as "relief strategy"). It is grammatically constrained, implying a certain degree of bilingual ability, similar to what occurs in adult bilingual use.

⁶ In the study of adult bilingualism *code-mixing* is identified with the use of two languages (or language alternation) within clause boundaries which involves single words (otherwise called intra-sentential switching); whereas *code-switching* would be a change from one language to another comprising clauses and units larger than clauses, that is, inter-sentential change of codes. Since the speech of a young bilingual child is different from that of an adult, a classification exclusive to early differentiation of languages becomes necessary.

- *Borrowing* in this context refers to “nonce borrowing” or “speech borrowing” (Grosjean 1982) as opposed to established borrowing. Children introduce spontaneously elements (generally lexical) of one language into the other due to several linguistic and extralinguistic motivations, such as a lapse of memory or weariness, but also consciously choose an item from the other language that is considered more suitable in the conversation.

Other concepts like *interference* (Grosjean 1992), described as the unintentional influence of one language on the other, *fusion* (Meisel 1994a), defined as the inability of separating the two grammars in a bilingual, and *individual creations* (Hoffmann 1991) are subsumed in the notion of code-mixing in the early stages of development.

Alternative explanations of mixing (see Genesee 2001) can be classified into two large categories: input-based and proficiency-based. Input-motivated mixing corresponds to the hypothesis that children exposed significantly to language alternation from adult (more proficient) bilinguals tend to mix more than children exposed to less mixed input. Parents’ tolerance towards the child’s use of mixed speech signals that mixing is acceptable, and thus implicitly encourage this linguistic behavior in the child (Lanza 1992). Proficiency-based hypotheses about mixing argue that children mix to fill linguistic gaps in their linguistic ability. Evidence supporting the latter explanation claims that a larger amount of mixing is reported when children use their less proficient language (Genesee, Nicoladis & Paradis 1995) or lack translation equivalents (Deuchar & Quay 2000). Genesee (2001) maintains that mixing is more appropriately viewed in terms of performance factors (proficiency) and not from the perspective of underlying competence, based on the fact that children reveal sophisticated pragmatic skills that

imply underlying differentiation. In my opinion, neither aspect may be separated from the other in the analysis of child speech, nor be directly compared at the same level.

Supposing children do discriminate between two systems at the underlying competence level, they may resort to mixing if lacking the ability to express themselves in the language of the discourse. Having differentiated systems at the representational level does not imply that they possess the knowledge to use that language correctly, which is rather a question of linguistic competence.

In Lanza's view (personal communication), different contact phenomena may have the same surface realization, thus requiring several types of analysis that should take into account factors such as dominance and context. The categorization suggested here, as well as any other attempt to catalogue young children's mixing phenomena, can be attested only at a theoretical level, and it is impracticable in the analysis of real speech. An apparent code-mix derived from lack of competence may be not less than the child's deliberate selection of a code that is different from the language of conversation (with a particular speaker in a certain situation), in order to avoid using the weaker language (i.e., the code in which s/he is less competent). The notion of bilingual language mode can be applied here to explicate this code-switching behavior, as well as the idea of awareness of the bilingual capacity of the interlocutor. Since it seems implausible to specifically determine the specific reasons behind a child's mixing manifestation at this juncture, it would be presumptuous also to make an accurate classification according to the categories stated above (or any other) other than a formal description. That is, a classification may be made of an analysis of mixing phenomena at the different levels of discourse (such as word, utterance, turn, etc.), grammar (phonology, morphology,

lexicon, etc.), or from the structure perspective (alternational or insertional), since these classifications do not prescribe the speaker's intentionality (or lack thereof) in the mix/switch.

Additionally, the classification of mixing proposed above allows predicting the kind of mixing phenomenon that may be expected in discourse with respect to bilingual knowledge (competence). In such cases where the speaker has less control over the grammar(s) of the discourse, code-mixing and borrowing may be expected, whereas in cases of a high command over the linguistic structures no code-mixing is expected. That is, either monolingual-only speech is produced in monolingual conversations or code-switching appears when the interlocutor alternates or can alternate languages. Borrowings can be expected in any situation. In circumstances where translation equivalents are lacking, the speaker can resort to the other language to find *la mot juste* (Gafaranga 2000). For a competent speaker, borrowings can be a resource to compensate for a lapse of memory, or they can have an explicit purpose in the conversation, for instance, a semantic differentiation.

2.5 Discussion and conclusions

This chapter has summarized current theoretical and methodological trends in bilingual acquisition research. Taking as a starting point monolingual studies on how linguistic competence arises, I have presented a broad perspective of the formal principles that govern monolingual (and somewhat by extension, bilingual) linguistic ability. Then, I have reviewed several crucial issues particular to bilingual acquisition in early childhood. The discussion centered on the patterns that can be established according

to the sequence of language development, the order or acquisition, and the question of language dominance. Section 3 sketched out the notable work conducted in representation and processing of bilingual knowledge. Notwithstanding the agreement across studies with respect to rate of bilingual development and input conditions, I then evaluated the question of whether bilingual children have one undifferentiated linguistic system or two linguistic systems. While the trend in publications points towards separate linguistic representation of codes in the bilingual child, the question remains unresolved to date. Lastly, aspects of bilingual performance, including setting and input conditions, determiners of language choice and language mixing, were examined, revealing the problems in current attempts to motivate language alternation phenomena in very young speakers. While a categorical classification of mixing phenomena is only possible at the hypothetical level, it is impossible to determine exactly the motivations behind a mix in the speech of a very young bilingual. The researcher is limited to describing language contact manifestations within the context of conversation.

The large body of descriptive bilingual studies reviewed here mainly concentrate on single aspects of bilingual development in isolation, without exploring the complete configuration of elements involved in bilingual development. It is perhaps not surprising therefore that principally sound efforts to construct models that encapsulate global views have not been forthcoming in recent times. Two notable exceptions in the literature are Hamers & Blanc (1982, 2000) and Gonzalez (1995).

Hamers & Blanc (2000: 122-128) advance a *sociocognitive interactional model* of language development within the functional framework. In brief, as the child internalizes social values, forms and functions of language which are valorized contribute to the

formation of the speaker's linguistic identity (language socialization process). The authors claim that as linguistic forms are mapped onto communicative and cognitive structures, the communicative linguistic, conceptual linguistic and metalinguistic competences develop. In simultaneous bilingual acquisition, a new set of complex compound form-function mapping occurs and two linguistic forms are associated to one function, whereas in cases of consecutive bilingual acquisition, mapping between form and function is initially established in one language and a new form is attained to fulfill the same functions. The advantage of this model is that it may be applicable to both bilinguals and monolinguals, as it takes into consideration interpersonal interactions occurring in the child's social environment that allow the child to map and develop representations of language behavior. Although this model effectively integrates social and psychological aspects of bilingualism with social networks, it fails to explain the character of bilingual competence per se in the course of language development. Neither the nature and representation of early linguistic knowledge, nor the internal mechanisms and operations implicated in language acquisition and processing of linguistic input are specified in Hamer and Blanc's (op.cit.) approach.

Gonzalez (1995) proposes a model for bilingual children, called the *interactional model*, whereby cognitive, cultural and linguistic factors have an influence (a triple interaction) on the construction of semantic and abstract categories. She indicates that language development is preceded by cognitive development, as a general process of concept construction. Corresponding to verbal and non-verbal conceptual development, the bilingual children in her study constructed two classification systems: one (non-verbal, abstract, and universal) common to both languages, and the second one related to

the marked language (in this case, Spanish) for the non-verbal gender-based classification system. Ultimately, this depends on the similarities in representations of symbolic meanings of the linguistic conventions in the sociocultural community. With respect to representational systems, Gonzalez concludes that the process of concept construction is contingent upon languages (taking into account the cultural value a particular concept may have) and rejects the notion of compound and coordinate types of bilingualism, since "the construction of one or two representational systems is not related to the history of language learning in bilinguals" (1995: 236). Gonzalez's model, and a revision thereof (Gonzalez & Schallert 1999), offers a deeper understanding of the nature of internal mechanisms of language processing and knowledge representation and recognizes, in effect, the influence of socio-cultural factors in the acquisition of linguistic competence. However, it focuses exclusively on cognitive development and specifically on meaning construction, disregarding other aspects of grammatical structure.

Besides the deficiencies mentioned, the major shortcoming in the two bilingual models is that they provide a general interpretation of language development without defining the necessary interactions between elements of competence (and its internal mechanisms) and instantiations of actual performance. By putting aspects of both models together, the current work will ambitiously attempt to move closer to the goal of considering the whole spectrum of sociolinguistic and psycholinguistic aspects in a single empirical analysis to account for the development of child bilingual competence and bilingual language use in conversation. The first step takes place in the next chapter, by positing a bilingual model of language development based on modularity components.

CHAPTER 3

DEVELOPMENTAL MODEL OF BILINGUAL KNOWLEDGE REPRESENTATION

This chapter introduces a model of bilingual acquisition that applies to emerging linguistic knowledge. A modular account of linguistic representation is proposed based on innate universal principles and maturational constraints, with the aim of explaining the course of bilingual language development. Following a modular justification, a definition of “system” is advanced. An overview of the model is presented in the third section of this chapter. Section 4 examines the results from case studies in the literature that differentiate phases of development in the diverse linguistic modules.

3.1 Language Modularity

The goal of the model proposed is to advance an explanation of the operations involved in bilingual acquisition through a series of developmental stages. I take as a point of departure innate, theoretical principles as elucidated in the previous chapter, such as the theory of UG and the Principles and Parameters framework (Chomsky 1986, 1988), as well as the notion of language modularity (e.g., Fodor 1983). Psycholinguistics and Cognitive Science research suggests that linguistic knowledge is encapsulated in self-contained units that operate independently to restrict data flow. This notion of linguistic modularity entails that specific processes carry out explicit subtasks pertaining to language competence and performance. In other words, specialized units execute specialized tasks to construct a linguistic system.

The modular approach to language knowledge that I advocate rests on the assumptions from Chomsky (1981) and Fodor (1983), who support an autonomously

operating language faculty in line with natural principles and mechanisms restricted to other cognitive modules in the brain.⁷ Accordingly, the structural design of the language faculty is believed to be distributively arranged in several levels of units that operate with respect to autonomous subsystems of linguistic theory.

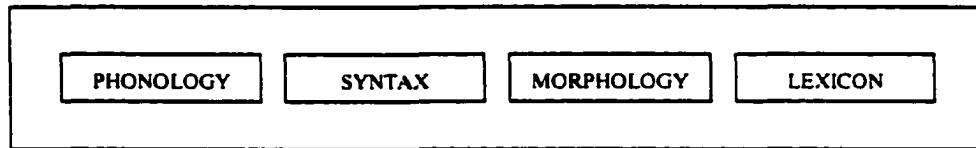


Figure 3.1 Modules in Linguistic Faculty

In general terms, the most salient property of a modular construction and internal procedure is the restricted domain in which it operates. Modules function on particular categories of input in isolation and produce a highly constrained output, which additionally has to be processed in turn. Furthermore, modules operate mechanically and encapsulate information at high speed.

A modular approach to language acquisition is applicable to both underlying representation of language knowledge (competence) and development in speech production (performance). Recent theoretical propositions mentioned in the previous chapter (for instance, Grosjean 1997 and Deuchar & Quay 2000) picture bilingual condition and development by interlacing competence and performance processing modes. Deuchar & Quay's bilingual data suggest the presence of early modular components displaying intermediate surface structures (such as syntax-phonology,

⁷ Chomsky and Fodor's notions of modularity are quite distinct. While Chomsky refers to modules as a means to explain the organization of linguistic competence, i.e. knowledge representation, Fodor posits modularity specifically in terms of language processing, proposing a series of modularized functions and constraints on the processing of linguistic information.

syntax-semantics, etc.), hence giving the appearance of early grammar(s) with concatenated form(s). In the development from child language to adult language lies a process of acquiring a series of discrete items within each linguistic module. Thus, language development is understood as a systematic and principle-ruled specialization of an existing compartmentalized language faculty. From a modular point of view, bilingual language representation can be based on a maturing dynamic single system that presents internal characteristics of separateness postulated by the dual system interpretation. Within this conception, the Unitary and Dual System depictions do not appear as opposites, but as essentially connected hypotheses. Thus, the necessary approach should focus on how and when the modules operate in a fashion that can be interpreted as the appropriate concatenation of grammatical components. Furthermore, a modular account of early bilingual acquisition requires the construction of intermediate representations which identify diverse stages of bilingual development. This understanding yields to the notion of *unmatched modularity* (Satterfield 1999, Satterfield & Pérez-Bazán forthcoming), which starts from the assumption that the child's immature early "grammars" are irregular and inconsistent with adult-like target linguistic (and social) communicative categorization, for which they cannot be considered as (a) fully-efficient linguistic system(s).

In this section, I have outlined a modular approach to bilingual language development that is applicable to both aspects of language differentiation: competence, as the underlying representation of knowledge, and performance, as the development of modules in actual language use. Sections 3.3 and 3.4 below expand on these issues and offer further theoretical and empirical justification for modular construction in the

representation and use of bilingual knowledge. The next section proposes a definition of what constitutes a linguistic system within a modular-based framework.

3.2 Linguistic System

Given that the language faculty may be congruent with a modular notion of competence and performance tasks, it can be acknowledged that linguistic modularity allows efficient processing distributed concomitantly among the (modular) units, thus precluding the need for complex general cognitive mechanisms. Moreover, the maturational nature of modules as cognitive mechanisms reveals the divergence between child- and adult language faculty. Thus, a modular approach to language development coincides with facts from typical L1 language acquisition as well as from bilingual L1 acquisition. It is presupposed that L1 acquisition is to some degree attributable to growth operations not occurring in adults, which affect grammatical and processing modules with respect to automaticity, functioning speed, and constrained output. Crain & Wexler's non-maturational stance, the *modularity matching model* (1999: 389), claims that linguistic abilities are equivalent in children and adults. While I agree that children have access to UG, just as adults do, and that the presence of language modules is biologically specified, Crain and Wexler's assumption that children and adults are equivalent in the mechanisms they employ in language processing, i.e. "they have access to a universal parser", seems controversial. As an alternative, I advocate that (a) fully-developed grammatical system(s) is/are the result of an increasing attainment of a threshold of linguistic development inside each module, and therefore, such (a) complete system(s) cannot exist in the mind of a newborn. Likewise, Pinker (1997) maintains that

linguistic modules are innately devised to mature internally. Therefore, I concur with the idea that the mind of a very young child does not hold a fully-developed system but an increasing attainment of a threshold of linguistic growth within each discrete module that eventually brings about (a) complete grammatical system(s).

In a nutshell, to the extent that linguistic knowledge possesses innately structured elements, it can be assumed that such modules develop over time. The “central” system is ready once an adequate amount of information has been incorporated via operating (intra- and inter-level) interface components for the modules. In this manner, I adopt the definition of linguistic system in Satterfield & Pérez-Bazán (ib.cit.) as “knowledge systematically derived and represented in highly interactive modular (i.e. mature) interfaces” (13).

Thus far, I have presented in this chapter the principles that sustain the current model of bilingual language development. The following section offers a brief account of the representational architecture and internal processing mechanisms of bilingual knowledge in very young children.

3.3 The model

Satterfield & Pérez-Bazán (S&P-B) introduce a conceptual model describing some internal processing mechanisms that may motivate acquisition tasks in both bilinguals and monolinguals. The present chapter includes only an overview of the model proposed, since in-depth examination of the model is beyond the scope of the present study of language choice (see further Satterfield & Pérez-Bazán for concise discussion). The initial language architecture is understood as encompassing a number of active units

(phonology, syntax, morphology, etc.) set to develop in accordance with their own particular schedule and specific linguistic functions. This conception corresponds to a certain extent to the Lust et al. (1999) proposition for monolinguals.

The S&P-B model posits a language faculty that is hierarchically organized into three developmental tiers of sub-grammars. Each level displays well-formedness at a certain phase in development.

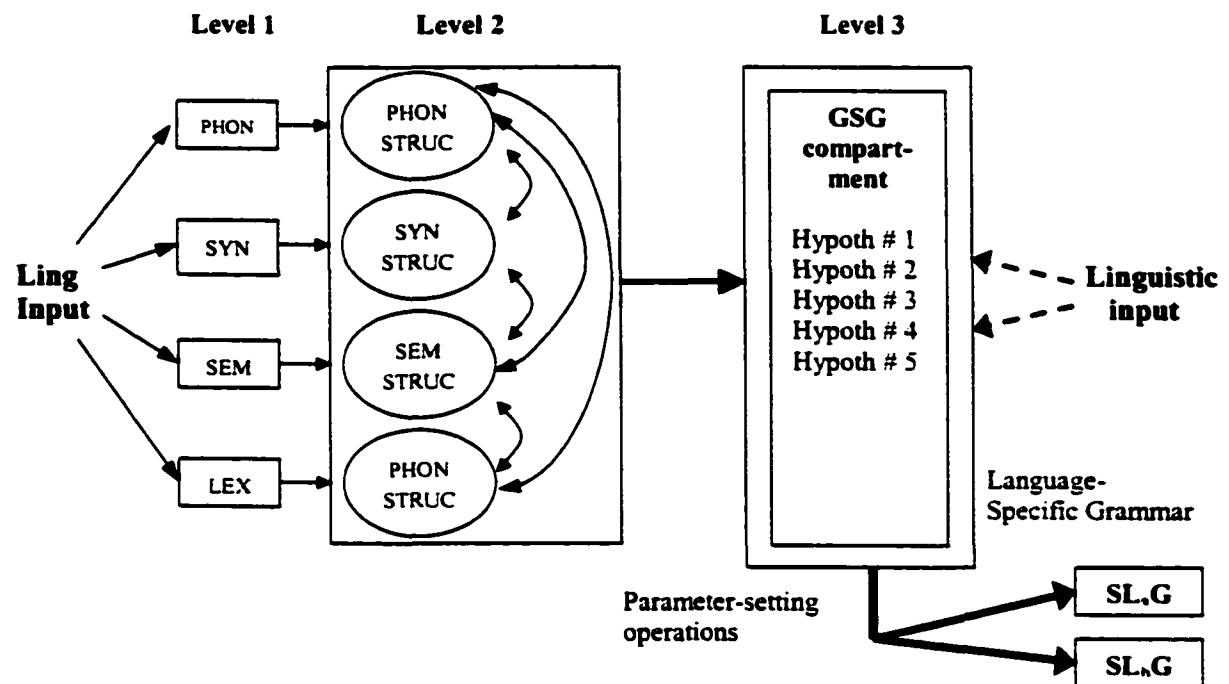


Figure 3.2 Overview of S&P-B Modularity Model

The three levels are briefly described below:

Level one represents local modularity. Innate UG principles are activated by incoming primary linguistic data within each module in isolation. This operation is carried out by a series of grammatical translators that encode matching UG-mediated features from the

surface configuration of the input data and map the encoded strings to each specific module. Each module locally accumulates internal representations, until a set of universal principles is satisfied and the output data from each module can be considered well-formed. Once the respective modules in this tier have satisfied the necessary activation threshold and outputted their specialized information, a second level of architecture is triggered.

While level one is concerned with autonomous modules, level two controls modular interactivity. Incremental communication between the independent modules proceeds in a dynamic and non-restricted manner as sophisticated central processors concurrently convey the modularized UG strings. This intra-modular integration of information undergoes several evolutions and ultimately offers complete and well-formed candidate strings for language representation. For instance, the representation outputted from an activated general lexical module is sent out to the activated phonological module and vice versa. Increasing activation in the modules and communication of UG information fits into an elementary representation of a generalized linguistic system. Growing interactivity at the modular interfaces may provide greater complexity in the speaker's grammatical representation (competence). Once modular coordination reaches an acceptable threshold at this intermediate level, a UG-mediated integrated representation of modules is outputted to a third tier.

Level three is essentially a storing compartment that sustains a population of representations or general systematicized grammars (GSGs). GSGs undergo parametrization to ultimately produce the final-state language-specific system(s).⁸

⁸ See Satterfield (1999) for details of bilingual parameter-setting operation.

The authors claim that since the grammars are modularly integrated yet unspecified in terms of parameter values, the model is appropriate for both monolingual and potentially bilingual children. Theoretically, parametrization occurs at the third-level mapping. As the pool of hypothesized grammars progressively becomes organized around the one or more input languages, a child will have the opportunity to analyze target and non-target constructions. For a monolingual, one class of hypothesis “survives” from the compartment of generalized systematized grammars, and results in a single language-specific grammar, whereas for a bilingual, dual exposure generates two hypothesized grammars.

The proposed model is capable of constructing intermediate representations that seem to simplify the bilingual learning task. Level one portrays an initial phase in which children search for grammaticality in limited word sequences, while level two describes how the autonomous modules interrelate. Finally, level three characterizes an emerging general system on the basis of modular interaction and coordination. Once a language-specific system comes online after parameter fixation, Satterfield & Pérez-Bazán predict particular types of sporadic interface constructions in the speech of monolinguals and bilinguals. They pinpoint the need to examine specific grammar modules to gain insight into the performance system (Chomsky 1965).

The next section illustrates how each of the linguistic modules develop, based on results (visible in performance) from studies on monolingual and bilingual acquisition.

3.4 Development of Linguistic Modules in a Bilingual

The purpose of this section is not to present an exhaustive account of the underlying performance components but rather to identify intermediate properties at the different stages of development, as hypothesized by the S&P-B model and further supported by language acquisition studies found in the literature.

Figure 3.3 offers a generalized summary of the development of linguistic modules. Each module is represented on an axis that includes the stages of language production and the average ages in which discrete linguistic phenomena were observed, according to language acquisition research.⁹

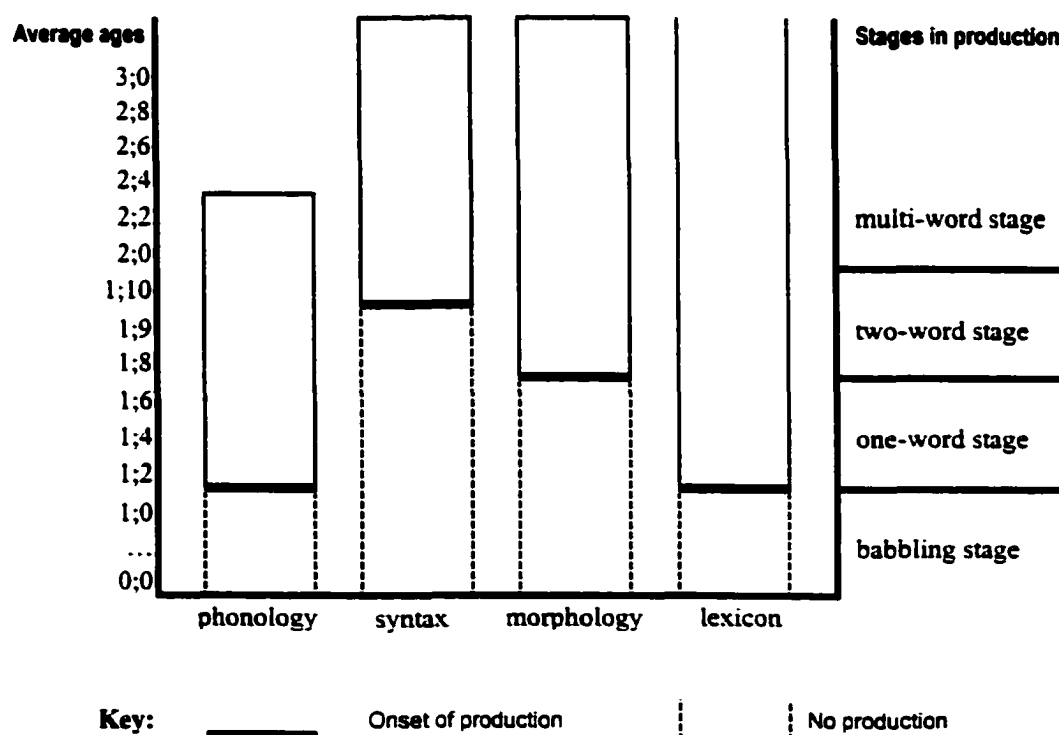


Figure 3.3 Comparison of Development of Linguistic Modules in Language Acquisition

⁹ Age values are to be considered as approximate, since each individual language learner is different (see Bates et al. 1995).

In the following section I present data from the literature according to each linguistic module in the order in which they first emerge in production.

3.4.1 Phonological Development

According to the literature reviewed, from the moment children are born, they show sensitivity to speech sound recognition, which suggests that they are endowed with phonological universals and the early capacity to discriminate sound patterns. Moon et al. (1993) observed a preference in newborns for listening to their native language. Moreover, an earlier study from Mehler et al. (1988) showed that two-month old infants discriminated between two unknown languages that belong to relatively distinct language families. Bosch & Sebastian-Galles (1997) documented in their study (Catalan-Spanish) of two groups of 4-month olds that whereas monolingual infants showed evidence of distinguishing both languages, bilinguals did not demonstrate language discrimination. Jusczyk (1997) shows that infants at 0;6 seem to lose their prior ability to detect phonological cues demarking major grammatical constituents belonging to unfamiliar languages. Instead, they concentrate their sensitivity only on cues relevant to their own language. Nazzi et al. (1999) found evidence to support the claim that 5-month olds are sensitive to rhythm, but restricted to their native-language rhythmic class, and that they develop from a general to a more specific sensitivity to rhythmic properties.¹⁰

Leopold's (1939, 1947) data of a German-English bilingual shows two separate courses of development in the child's acquisition of the languages' prosodic structures from age 1;6 to 2;0. Paradis (1996) deduced that Leopold's subject did not really possess

¹⁰ For similar findings on how perceptual capacities become more language-specific, see Stager & Werker (1987) and Werker & Tees (1999).

differentiated prosodic structures. Accordingly, inventories may be initially organized according to segments sooner than by distinct language systems. Pearson et al. (1995) similarly suggest that language-specific segments do not emerge in considerable enough quantities to hypothesize the presence of two grammars in early data (Spanish-English), while later corpora do reveal language-specific units. Additional research shows phonological differentiation in consonant production in English-Spanish bilinguals only at 2;3 (Schnitzer & Krasinski 1994 and Deuchar & Clark 1996). Nicoladis & Genesee (1997) admit that early phonological development in bilinguals may indicate “a universal pattern of acquisition” common to all language learners. Likewise, Deuchar & Quay (2000) observed that, at 1;10, common sounds are attained prior to language-particular phones.¹¹

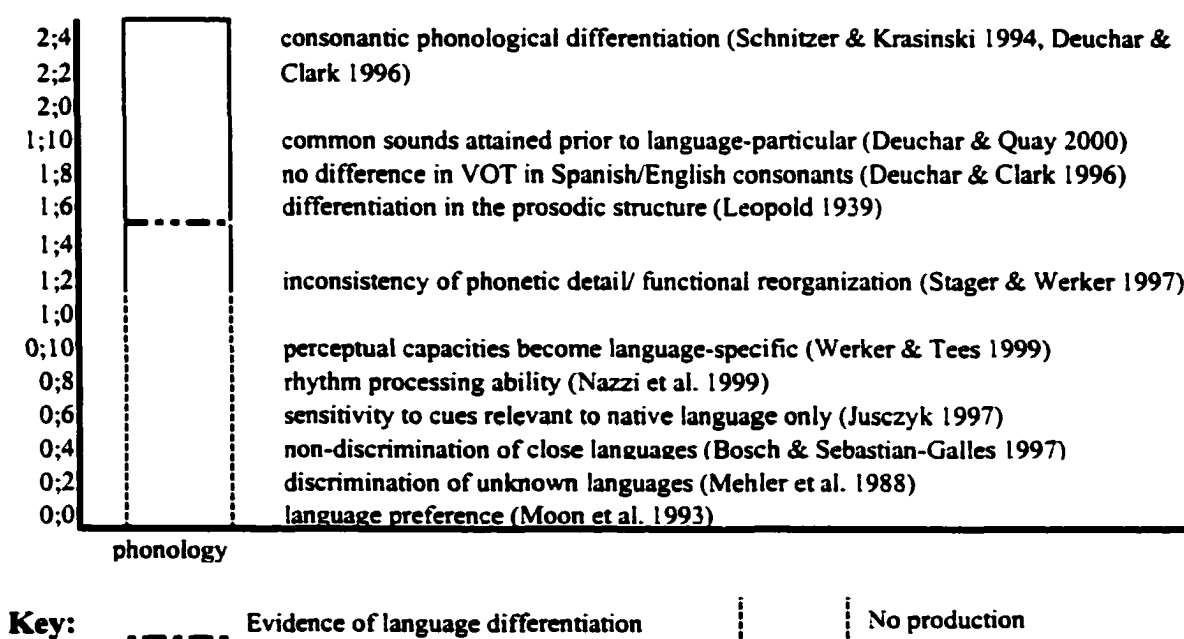


Figure 3.4 Phonological Development

¹¹ Interferences are more likely to appear when two languages are closer in their phonological and morphological characteristics (Hoffman 1991) or if language input reveals a dominance relation (Fantini 1985).

3.4.2 Lexical Development

The evaluation of modular development for the lexicon seems intricate in production, since the child's lexical competence necessarily integrates other linguistic modules, such as phonological or semantic elements. Nevertheless, these modules may be distinguished. In contrast to phonology, the onset of lexical maturation and differentiation appears to occur at a later time in the child's linguistic development. For instance, comprehension tests show acoustic sensitivity indicating word boundaries in newborns (1-4 days old) (Cristophe et al. 1994). 4.5-month-old infants recognize the sound patterns of their own names (Mandel et al. 1995) and by 7.5 months they prefer listening to familiar words as opposed to unfamiliar ones (Jusczyk & Hohne 1997). According to Jusczyk's (1997) studies, by 10 months children recognize weak-strong forms, i.e. unstressed versus stressed words. By 0;11, they seem to listen to words as potential sources of semantic content (Hallé & de Boysson-Bardies 1996). Werker et al. (1998) observed that at 1;2 monolingual infants extract words from the speech stream, recognize previously heard forms, and associate words with objects. By age 1;4, children are assumed to process known and unknown words differently, but they do not display referential understanding of word meaning until approximately 1;8.

With respect to early lexical production, there seems to be universality in the babbling or initial stage which then becomes more language-specific, in fact just as occurs in perception (Werker & Tees 1999). By 10 months of age, the structure that forms vowels and some groups of consonants in production is closer to the native language compared to other related languages (de Boysson-Bardies & Vihman 1991). Data analyses indicating that children possess translation equivalents (words from each

language with the same conceptual referent), which are widely used in the literature to posit further evidence for language differentiation in the production of lexical items, are apparently controversial. Deuchar & Quay (2000) point out that their subject produced lexical translation equivalents from age 10 months on, but that this does not presuppose separate language-specific systems at such an early moment in development. While Vihman (1985) reports 10% of translation equivalents at 1;2, Quay (1995a) observes the use of translation equivalents in her subject from the onset of speech, reaching a 40% quota from 1;5 to 1;10. Lanvers (1999) interprets the appropriate use of equivalents as evidence of emerging lexical separation approximately at the age of 1;6. Nicoladis & Genesee (1997) maintain that if a period exists in which the child does not distinguish words belonging to two different languages, it only occurs extremely early in the development, until the child acquires approximately 50 words. Johnson & Lancaster (1998) distrust the legitimacy of even hypothesizing that translation equivalents indicate language-particular lexicons, a view that the current model also upholds.

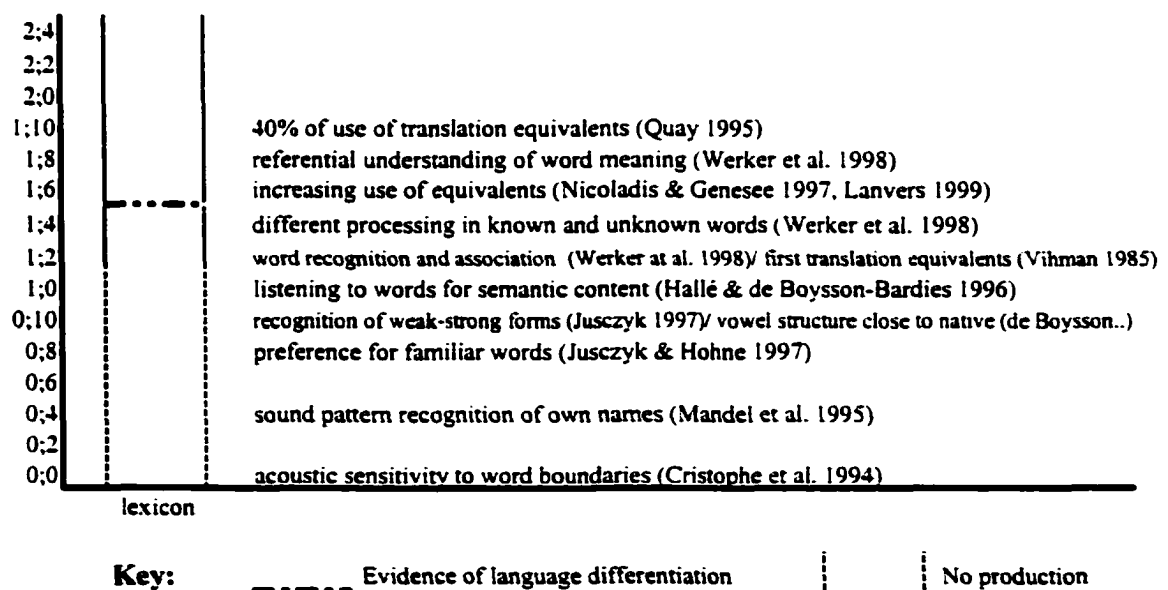


Figure 3.5 Lexical Development

3.4.3 Morphosyntactic Development

According to reports in the research literature consulted the emergence of morpho-syntactic structures occurs at a later point in time than phonological and lexical production - at the beginning of the two-word stage. Apparently, children do not display language-specific syntactic structures until the multi-word stage. In the case of bilinguals, this may be a source of determining at what point in time children do actually differentiate two separate languages in production.

Examining data of two-word utterances (1;7 - 1;9), Deuchar & Quay (1998) find evidence for the existence of a single rudimentary grammar (predicate-argument), which is shared by the Spanish and English constructions of their subject. Although they report morphological variation, it is not until the multi-word stage that distinct grammatical structures are visible for each language, coinciding with the emergence of functional categories (Meisel 1989). Meisel argues that when children start to use syntactic mechanisms of expression they are able to discriminate between two systems. Explicitly, children exhibit distinct use of two systems from the onset of syntactic production (from 1;11 onwards) in the form of appropriate word order, verb-agreement morphology, and use of overt subjects (Meisel 1989, 2000). Moreover, Lanza (1997) and Klausen et al. (1993) indicate morphological mixing and an occurrence of interchangeable inflection markers just before age 2;0. It is necessary to mention that syntactic differentiation in languages with related word order, such as SVO Spanish and English will be more difficult to recognize, compared to cases in which children acquire languages with a different word order, such as German and English, as in Meisel's (1989) bilingual study.

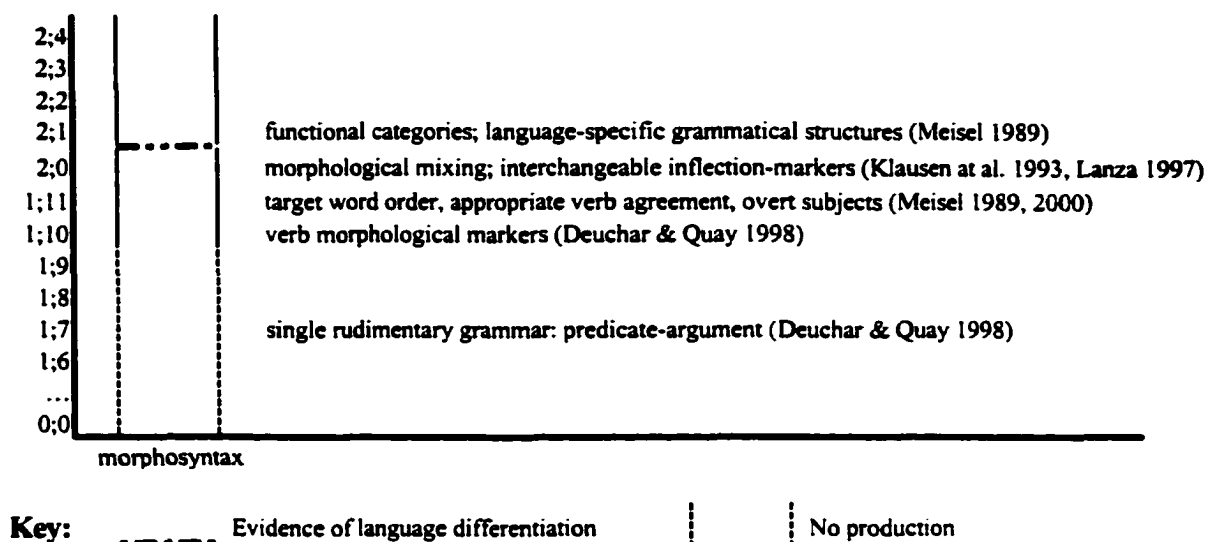


Figure 3.6 Morphosyntactic Development

With support from the current language acquisition literature, this section has aimed at validating a modular characterization of linguistic representation in the course of language development. The findings provided appear to sustain the argument that, at the start, children (monolingual and bilingual) systematize general information in discrete modules, which progressively interact with other modules to finally construct complex linguistic representations. The empirical evidence examined above illustrates how each module has its own particular timing of development and interaction.¹² Consequently, initial grammars do not originally reveal equal underlying integrated tendencies as those existing in fully-systematized adult grammars do. Moreover, bilingual studies indicate the presence of a general universal systematized grammar common to all L1 learners (with one or two first languages) in the earliest acquisition periods, and strengthen the concept

¹² A word of caution with respect to the evidence presented in this section is that, although instances across the individual modules are reported, it is not possible to determine whether the identified ages reveal a precise onset of language differentiation, or whether they are simply an indication of the first occurrence successfully noticed by the researcher.

of linguistic development as a dynamic process. The outcome from the language acquisition process, i.e. one or more language-specific grammar(s), will depend on the nature of the input (single or dual) the child receives.

3.5 Summary

This chapter introduced a working model to characterize bilingual (and monolingual) language acquisition that constructs intermediate representations in the bilingual task. Taking the assumption that human linguistic capacity is modular in nature, as well as language itself, I distinguish three levels of development. The proposed model hypothesizes that linguistic input acts upon the different linguistic modules which, mediated by UG principles, encapsulate information and output it at their own timing. After a phase of inter-modular communication, the information processed in the modules produce hypotheses of possible grammars which, after parameter-setting operations, turn into well-formed language-specific grammars.

Provided that early bilingual grammars do not display the same properties as adult grammars and that each module has its own timing to come “on-line” depending on constrained input and maturational issues, the analysis of bilingual child speech should not be much different from monolingual language study.

In the next chapters, the research program is presented together with the methodology employed to design and test this model of early bilingual speech.

CHAPTER 4

RESEARCH METHODOLOGY

In chapter 2, I examined a series of studies on bilingual acquisition that address aspects of linguistic competence and language use separately. In chapter 3, I proposed a model of bilingual grammatical development built on linguistic modularity, coordination and maturation principles which incorporates speaker competence and performance. In this chapter, I present the research design postulating that both aspects of linguistic analysis need to be examined simultaneously. Section 4.1 introduces the general theoretical problem in this study, followed by a number of working hypotheses to formalize the question. Then 4.2 describes the research design itself, including a brief report about the participants and a detailed account on the process of data collection. A subsequent section overviews the amount and nature of the gathered data.

4.1 Research Question

The main focus of this study is the analysis of language choice in developing bilinguals exposed to two languages from birth. The issue of language differentiation involves two aspects, which are addressed in the investigation:

- 1) The level of linguistic representation, i.e. the speaker's underlying grammatical/linguistic competence, and
- 2) language use, explicitly, the function of emerging languages in a manner appropriate to the interlocutor and the context of conversation.

The general research problem motivating this study concerns both of these aspects and poses the following questions:

Does representation of linguistic knowledge exhibit differentiation that correlates with language use? Specifically, during speech production, is there a choice of code available to very young children simultaneously exposed to two languages from birth? If this turns out to be the case, do psycholinguistic or sociolinguistic factors, or an interaction of both aspects of language differentiation, influence this choice?

4.1.1 Theoretical perspective

To date in the literature the question of language differentiation undertakes the above-mentioned aspects in rigid isolation. The mainstream of research studies on this topic concentrates on two matters:

First, the formal relationship between both languages in the bilingual is examined, specifically, whether the emerging linguistic knowledge underlying the bilingual capacity develops as one or as two separate systems from the onset of speech production.

The other focal point of language choice research takes up a sociolinguistic approach based on input conditions. Lanza's (1992, 1997) work suggests that children have communicative competence, that is, internal resources are accessible to them for choices in the language they use, which involve grammatical knowledge and appropriate pragmatic use from an early age. She argues that the child learns to differentiate languages as part of the language socialization process. Similarly, Quay (1995b) regards language socialization as the key factor to explain bilingual language acquisition.

While it seems apparent that these components are equally important, to my knowledge, there are few, if any, studies that treat the question of language choice in early bilingual acquisition involving both the role of psycholinguistic and sociolinguistic

factors within the same analysis. In order to explain the availability of language choice in developing bilinguals, both approaches to language differentiation need to be considered in parallel.

4.1.2 Hypotheses

I formulate several working hypotheses in order to facilitate examination of the research question. These questions are centered on the two crucial issues of language differentiation outlined in section 4.1.1: its representation and use, or in other words, linguistic competence and performance. In addition to the speaker's grammatical knowledge and production, including socio-communicative ability,¹³ the function of mixed speech and the role of input are further aspects that must be addressed in order to obtain a concise overview of the research question.

Taking into account the foregoing discussion, I propose the following hypotheses and predictions:

- 1) If language choice is available to very young bilinguals, it is hypothesized that they will respond appropriately, i.e. within normative boundaries, to the input language of their interlocutor(s) and to the context in conversation.
- 2) I hypothesize a strict correlation between linguistic competence (in both languages) and the availability of language choice. Hence, the degree of linguistic competence is predicted to correlate with appropriateness of language use as a response to input.

¹³ Socio-communicative ability refers to appropriate attitudes toward the interlocutor and the language(s) of the conversation. Language selection, timing, and manner of speech should correspond to the interlocutor and the context, i.e., the speaker selects which language to speak, when to speak it and how to speak it according to what the interlocutor and context demand. Consistent with the hypotheses formulated below, appropriate language use is an indication of communicative competence.

Consequently, if language choice were not accessible at a given early age (coinciding with the emergence of grammar), this may be an indication that children are not (yet) fully-competent bilinguals (with respect to normal development at their age), as Köppe and Meisel (1995) suggest. Or to the extent that young children are competent, then the unavailability of bilingual choice at such an early point in bilingual acquisition would contradict Lanza's (1997) findings and those of the proponents of the two-system representation.

- 3) If the general hypotheses established in 1) and 2) are correct, it is possible to predict a correlation between the degree of linguistic competence (along with adequacy of code selection by association) and alternating use of both languages (mixing). If the speaker displays a low degree of linguistic/grammatical competence, and responds inappropriately to the language of the interlocutor, more cases of mixing may be expected.¹⁴ Alternatively, if the speaker has a higher command over the grammar of the conversation code(s), less mixing may appear.¹⁵

Meisel (1989) and Köppe and Meisel (1995) claim that variation in the formal properties of mixed speech is related to grammatical development. Moreover, pragmatic aspects influenced by input contribute to language differentiation. De

¹⁴ The degree of linguistic/grammatical competence is assessed on the basis of grammatical knowledge and lexical resources displayed by the speaker, and compared to the norms for normally developing monolinguals. An explanation of the competence measurements applied to the current study can be found in chapter 5.

¹⁵ The reader is referred back to the detailed discussion on the functions of mixing in the second chapter. A differentiation between code-mixing and code-switching is not measured in the present analysis, due to the problem exposed earlier, about the implausibility of determining with certainty in the very young speaker the motivations behind a mixing phenomenon, either due to the lack of competence (code-mixing), or to create a specific effect in the conversation (code-switching) with (relatively to the development) full control over the grammar of the languages in the conversation.

Houwer (2000) argues that the use of mixed utterances is a language choice strategy within socialization patterns rather than a sign of insufficient language skill.

- 4) A correlation between input conditions and bilingual competence, as well as input and appropriate language use, is predicted. The higher the amount and quality of exposure to a language, the higher the level of competence and the higher the appropriateness of use for that language will be.¹⁶ Subsequently, a correlation between input factors and mixed utterances is predicted to result.

Lanza (1992) suggests that parental linguistic behavior influences the child's linguistic choice in conversation. De Houwer (1990, 1995) maintains that language exposure patterns from birth determine the sequence of bilingual development (and implicitly, the quality of bilingual capabilities). Paradis & Genesee (1996), on the contrary, claim that the amount of input is not significant for the rate of grammatical development in a bilingual.

I now summarize what may seem a transparent claim but one that is rarely articulated within a unified formal account. It is hypothesized that bilinguality (availability of language choice) is driven by input conditions and subsequently determined by the level of linguistic competence (grammatical knowledge of two languages) and performance (appropriateness of language use as a response to input).

¹⁶ The amount of exposure can be measured in general by the number of waking hours the child is in contact with a particular language, or in case a set of data is considered, by the number of input minutes or conversational turns. On the other hand, the quality of exposure depends on several aspects of input condition, such as the degree of competence of the interlocutor in the language in question, the absence or presence of mixing phenomena in the speech, etc. These latter aspects are more difficult to measure.

4.2 Research Design

The procedures of data collection and analysis are elucidated in this section. After providing a general description of the setting of the study and the participant group, I describe how the data was collected, transcribed and quantified.

4.2.1 Participants

The average age range reflected in this study is 2;0 to 3;0. In order to meet the main objective of my investigation, the two-word stage at approximately 24 months of age, in which the range of lexical types increases and rudimentary sentences appear (Lenneberg 1967), was selected as the adequate moment to initiate data collection. During their second year of life normally-developing children acquire critical syntactic (Brown 1973) and pragmatic (Halliday 1975) abilities that are present in the adult linguistic system.

Six children between the ages of 1;8 and 3;3 participated in this longitudinal study. The sample of families selected consists of middle-class mixed marriages (i.e. spouses of different linguistic and cultural backgrounds) residing in university settings in monolingual English locations in the United States. The parents are the primary caregivers and exercise planned (or elite) bilingualism in the home by exposing their children to Spanish and English from birth on a daily basis. At the time of data collection, the children (except one) had no siblings and they all spent part of the day with babysitters or in a daycare.

The participants in the study were not selected based on an established status, but on the basis of conditions of exposure to two languages in their daily interactions at the

onset of the study, which potentially affords the opportunity of becoming bilingual (and, to a certain extent, bicultural) to different degrees. Table 4.1 below offers an overview of their individual characteristics.

The following section describes the procedure of collecting data from the participant families.

4.2.2 Data Collection

The data collection method implemented for this investigation is, in effect, a revised version of Lanza's study (1997). The current investigation consists of naturalistic/observational audio-taped recordings of spontaneous speech of the children at home in interactions with their parents (as primary caregivers, and as the major source of input of the minority language, Spanish).¹⁷

Parental recordings are used to avoid or at least to minimize the *observer's paradox* (Labov 1972), in the context of every-day family interactions. The presence of the researcher could be considered in this scene as an intrusion and would be likely to give rise to an alteration in the typical behavior of the participants in a particular situation.

Parents in the study were provided with instructions as to how to proceed with the data collection (see Appendix C). The main tasks the parents were requested to carry out were to tape record their child under specific circumstances, which will be explained next, and to keep a record of contextual information for each recording session.

¹⁷ In some cases the conversations take place outside of the home, such as driving in the car or going for a walk. Insofar as the activity carried out at that moment is a family activity, the pattern of language use with the child is assumed to remain the same as at home. The activities in these places can thus be considered an extension of home family life. See Deuchar & Quay (2000) for similar considerations with their subject.

	CHARACTERISTICS	CARLA	ALBERTO	JOHN	TINA	SHEILA	ANTONIO
Birth	Born on	July 5, 1996	April 15, 1996	March 22, 1998	Aug. 24, 1995	Nov. 9, 1995	July 11, 1995
	Born in	Michigan, USA	Missouri, USA	Michigan, USA	Spain	Michigan, USA	Michigan, USA
	Only child	yes	yes	yes	yes	no (third)	yes
Mother	Country of origin	Spain	USA	UK	Spain	Mexico	Spain
	Native language	Spanish	English	English	Spanish	English/Spanish	Spanish
	Second language *	English (S)	Spanish (S)	Spanish (I)	English (S)		English (S)
	Main language with child	Spanish	Spanish/English	English	Spanish	Spanish	Spanish
Father	Country of origin	USA	USA	Spain	USA	Indonesia	Tunisia
	Native language	English	English	Spanish	English	Indonesian	Arabic
	Second language *	Spanish (S)	Spanish (A)	English (S)	Spanish (S)	English (N)	English (S)
	Main language with child	Spanish	English	Spanish/English	Spanish	English	English
Parents	Language of interaction	Spanish	English	English	Spanish	English	English
Home	Basic pattern of language exposure	one language at home	one parent-one language	one parent-one language	one language at home	one parent-one language	one parent-one language
Relatives	Other native languages	Galician (M's grandmother)	Tagalog (M's father)			Indonesian (F's mother)	Arabic (F's parents)
Babysitter / Daycare	English-speaking (ages)	0-1;11		0;9-3;3 (Chinese)	1;11-3;0	0-2;10	
	Spanish-speaking (ages)	1;11-2;11	0-2;6		0-1;11		0-2;6
Preschool	English-speaking (ages)	3;0-3;3	2;6-		3;0-	2;10-	2;6-
Playgroup	Spanish-speaking (ages)	2;0-3;3	2;3-2;6				
Setting	2;0-4;0 lived in	Michigan	Michigan	Michigan	Utah	Michigan	Michigan
Visits	To Spanish-sp. countries	6 weeks a year	2 weeks a year	2 weeks a year	4 weeks / year	2 weeks a year	2 weeks a year
	From Span.-sp. relatives	4 weeks a year				once a month	

Key: Shaded cells indicate a significant difference (with an impact on language development) in the characteristics of a participant with respect to the others

*Level of proficiency in second-language: N (native), S (superior), A (Advanced), I (intermediate).

Table 4.1 Overview of Participants' Sociolinguistic Profile

Recording sessions were planned to take place every two weeks for 90 minutes, distributed in 30-minute periods in each of the following situations:

- 1. 30 minutes alone with the mother;**
- 2. 30 minutes alone with the father; and**
- 3. 30 minutes with both parents.**

Taping with both parents was not necessarily restricted to triadic interactions and more people could also be present to allow for and observe a diversity of circumstances in the home in which the child's choice of language may be altered. Recorded interactions could take place in familiar situations for the child, such as playtime and daily routines such as eating, bathing, getting dressed, etc. To take advantage of a variety of speech contexts in parent-child conversations, parents were requested to tape-record in diverse situations when possible. The most common type of context is free conversation, typically within the frame of playing with toys, but also when getting ready to go out or during meals, etc. In the context of free conversation, either one parent is with the child or both parents are present. The second type of interaction is storybook reading and it usually happens between the child and one of the parents alone.

Since the purpose of the observation is to capture what the child says in her/his normal environment without inhibition, I indicated to the parents that it is more convenient if the child does not realize that s/he is being recorded. Likewise, families used their own tape recorders to avoid introducing unfamiliar objects into the child's surroundings.

Unlike many studies on bilingual language acquisition of this type (Lanza 1997, Deuchar & Quay 2000, among others), no special requests to collect data in either a

Spanish-only conversation or an English-only conversation were imposed on the parents. While these previous works reveal various advantages in controlling language context (see also Genesee 1989 and Grosjean 1995), the current study does not apply a controlled language context. This strategy is adopted to facilitate observation of family speech in a natural and realistic environment, which should take place in the context that the family itself constructs. To this end, the data collected occurs in the language of the family, which in some cases may be exclusively Spanish. To restrict the parents to specifically addressing their child in one or other language in a particular context and occasion could alter natural linguistic behavior, and would violate the same principles shaping this methodology of data collection.

To provide a detailed account of observation, parents entered written information to describe the situational context for each taping session. The standardized form used for this purpose can be found in Appendix D.

A further task for the parents was to keep a diary of the child's linguistic development as support data. The journal focuses mainly on lexical development (vocabulary acquisition), syntactic advances and mixed utterances, yet also includes information on context and reactions of the child. Diary guidelines originate in Braunwald & Brislin (1979) and were adapted by Lanza (1992) to fit the needs for information on bilingual language development. Guidelines for composing a diary are found in Appendix E.

My role as observer consisted in periodic visits to the family, when possible, either with the mother alone, with both parents, or with other family member(s) also present, such as grandparents, aunts and uncles. During these visits I carried out

interviews with the parents concerning the child's linguistic behavior and I observed the familial environment. Taping by parents took place depending on how appropriate the situation and activities were for a recording session. The children's selection of language with me as an observer and a family acquaintance was proportional to my relationship with the parents and our language of interaction. The closer my relationship to the parents (in particular to the Spanish-speaking parent), the more likely the children were to address me in the minority language.

Although diary entries and notes taken from my own observations constitute valuable support data, the parental recordings are at the heart of this study.

The following section presents an overview of the quantity and quality of data collected. Data transcription techniques are elucidated as well.

4.2.3 Transcription and Quantification of the Data

For data transcription, I rely on the CHAT format of the CHILDES system (MacWhinney 1995, 1996, 2000).¹⁸ The transcription is mainly orthographic; however, it includes phonetic transcriptions for potential problematic cases, such as those items that cannot be related to any of the adult's languages, and for the child's idiosyncratic pronunciation of certain words. The transcriptions in CHAT-format are accompanied by English translations of all the Spanish utterances from the child and the adults. Prosodic markers as well as information concerning non-verbal behavior and context were included where deemed relevant to the discussion. Selected conventions for CHAT transcriptions can be found in Appendix F.

¹⁸ See also Sokolov & Snow (1994) and the official website for CHILDES on the Internet: <http://chilides.psy.cmu.edu>.

For further analysis, all conversation sequences were transcribed in which a switch in language occurs (be it code-switching, code-mixing or borrowing; originated by the child or by the parent), contained in preceding and subsequent related utterances. Exceptions from language switches are proper names in the other language, lengthy songs, and passages in story-reading not pertinent to the analysis.¹⁹

The proposed average age of 2;0-3;0 for the participants of the study actually varied slightly from child to child. In each case the range was determined by the family circumstances and the readiness of the parents to participate in a long-term study of this nature. Table 4.2 shows an overview of the age span of the six children during the time of data collection.

PARTICIPANTS	TAPE RECORDINGS	DIARY KEEPING
Carla	2;0 – 3;3	2;0 – 3;4
Alberto	1;8 – 3;0	2;1 – 2;7
John	2;0 – 3;3	n/a
Tina	2;2 – 2;11	0;9 – 4;0
Sheila	2;2 – 2;11	n/a
Antonio	2;11 – 3;2	n/a
TOTAL RANGE	1;8 – 3;3	0;9 – 4;0

Table 4.2 Age Range of Children During Data Collection

Data quantification included measurements based on amount of time recorded in each of the possible types of interactions between parent(s) and child (dyadic and triadic

¹⁹ The totality of transcriptions will appear in the CHILDES databank and it is available upon request.

conversations). A length of conversation recorded in any kind of parent-child exchange in the same day is considered a session.

PARTICIPANTS	Carla	Alberto	John	Tina	Sheila	Antonio	TOTAL
RECORDING HOURS^a	24	12	6	5	2	2	51
with the mother	10	3	2	5	2	2	24
with the father	4	5	2.5	0 ^b	0	0	11.5
with both parents	10	4	1.5	0	0	0	15.5
DIARY ENTRIES^c	63	30	3	125	0	0	221

^a The amount of recorded hours independently from the number of sessions

^b Total sums of recordings of less than 15 minutes are not considered in the count

^c A diary entry corresponds to the information noted in one day, or to separate topics with the same date

Table 4.3 Amount of Collected Data

Table 4.3 displays an empirical summary of the amount of collected data in recorded hours for each subject divided according to interlocutor (mother, father or both parents) and number of diary entries made. The purpose of this quantification is to overview the general amount of collected data and the distribution according to subject and amount of conversation with each parent, as source of input of (each) language.²⁰

Data collection procedures depend on, and at the same time, delimit the type of analysis projected for the data. Observational data is unpredictable in nature and subject

²⁰ Records providing an in-depth breakdown of the amount of recorded data, including dates, participant distribution, language of interaction, and exact length in minutes of each recording session can be found in Appendix G.

to the circumstances of recording, and yet is the best possible method known to capture authentic conversational interactions between speakers.

4.3 Summary

In this chapter, I have outlined the fieldwork methodology carried out in the study. The first section covered the research question under investigation. The hypotheses put forth focus on the availability of language choice in very young bilinguals as being driven by input conditions and ultimately shaped by linguistic knowledge and appropriateness of language use. Section 2 presented the research design, offering an overview on the participants selected for the study as well as a detailed account of the data collection, transcription and quantification procedures. The next chapter presents a comprehensive explanation of the process of analyzing and testing the data collected.

CHAPTER 5

DATA ANALYSIS

This chapter outlines the process of analyzing and testing claims put forth in chapters 3 and 4, specifically to confirm or disprove the hypotheses set out in chapter 4, based on collected data. A primary objective is to examine aspects of language differentiation, representation and use, in a more unified context than has been done so far in the literature.²¹ Experimental variables in the current study, as summarized in tables 5.1 and 5.2, combine both psycholinguistic and sociolinguistic features within a formally unified analysis. The first section presents a detailed description of the independent variables that constitute the aspects of linguistic input to which the child is exposed. Section 2 offers an account of the dependent variables, comprising child linguistic behavior in both facets of language differentiation, linguistic competence and language use.

5.1 Independent variables

Independent variables are related to linguistic input encountered by the child in the home. These variables encompass parental linguistic circumstances as conditioning factors for the child's linguistic development, as well as characteristics present in recorded conversations with the family.

Figure 5.1 presents an inventory of the nine different independent variables applied in this analysis. They are separated into two segments according to the source of information:

²¹ In the assessment of children's underlying linguistic competence, it is crucial to "understand the role of the grammar within the performance system" (Crain & Thorton 1998: 3).

- (1) **Preconditions:** This category is further divided into parental (linguistic and cultural) background and general language exposure conditions in the home with respect to parental supervision, based on anecdotal information extracted from parental interviews carried out during the time of data recording.
- (2) **Conversational Data:** Recorded data reveal parental language use and the contextual circumstances in which conversation exchanges take place with the child at home.

INDEPENDENT VARIABLES (parental input)

SOURCE	FOCUS	VARIABLE
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence
		Parental Attitudes to Child Bilingualism
	Language Exposure	Language Exposure Patterns in the Home
		Time Under Parental Supervision
		Language Exposure Outside the Home
Conversational Data (empirical)	Input	Parental Language Input in Conversation
		Context / Activity of Conversation
		Topic of Conversation
		Parental Response to Child's Mixing

Table 5.1 Summary of Independent Variables

Below, nine independent variables and the manner in which they are tabulated are highlighted:

- 1) **Parental Linguistic Competence in each Language.**

Given the level of grammatical competence exhibited by each parent, in English and Spanish, the language in which they have more linguistic capacity may serve as the medium for interactions with the spouse and the child. Evaluation of parental linguistic competence in each grammar is encoded for quantifying purposes based in part on the ACTFL Oral Proficiency Guidelines (see Breiner-Sanders et al. 2000): 5=ative; 4=superior; 3=advanced; 2=intermediate; 1=ovice; 0=insufficient evidence. Where:

5= native: the speaker makes no errors in grammar, has an extensive vocabulary and uses it accurately; pronunciation is within the range of speakers for whom this language is the mother tongue.

4= superior: the speaker makes only sporadic errors in grammar, has an extensive vocabulary and uses it appropriately, and the pronunciation is very close to the range of speakers for whom this language is the mother tongue.

3= advanced: the speaker makes few major errors in grammar, has a general vocabulary, and the pronunciation is entirely comprehensive to a native speaker.

2= intermediate: the speaker makes some major errors in grammar, has a limited vocabulary, and makes some pronunciation errors that make comprehension difficult.

1= novice: the speaker has difficulties producing simple sentences, the vocabulary consists of isolated words, pronunciation errors are frequent and s/he can be understood with great difficulty.

0= insufficient evidence: it is impracticable to make an estimate based on the information available on the speaker.

Several components of grammatical competence are charted for each parent, for each language. The score that best depicts the speaker's classification in that particular area of linguistic knowledge is assigned according to my appraisal, as a linguist and L2 educator, of their oral production. The differential between the averages obtained from each speaker's respective L1 and L2 is also calculated, as this difference between the scores represents a broad categorization of a degree of bilingualism in the speaker. Values obtained for each component are averaged (excluding 0) and rounded up to the next .5 value. For statistical purposes, the results obtained from evaluating the competence in the minority language are classified into two groups: 0 (covering 1, 2 and 3) and 1 (ranging from 3.5 to 5).

2) Parental Attitudes to Child Bilingualism.

Independent variable # 2 concerns how parents valorize their child's developmental bilingual experiences, especially as they relate to the minority language (Spanish).

Issues include: a) motivation: to use (or approve the use of) a language at home other than the community's or her/his own in order to provide their child with a richer linguistic input; b) value of minority language: these parents consider the minority language, Spanish, as a good linguistic (and cultural) asset for their child; c) identification with minority culture: the parents may identify themselves with the minority language/culture, in some cases even more than with the one they live in, due to their own linguistic and cultural background or that of their spouses.

These properties are captured in an incremental "high, low" scale for each parent, for the purpose of capturing parental circumstances regarding their commitment to their

child's bilingual development. More specifically, this variable is categorized into the following scale, which is applicable to each of the three aspects mentioned above:

5= Very high motivation / value of language / identification

4= High motivation / value of language / identification

3= Moderate motivation / value of language / identification

2= Low motivation/ value of language / identification

1= Minimal motivation/ minimal value of language / no identification

0= Insufficient evidence

The values obtained for each aspect are averaged (excluding 0) and rounded up to the next .5 value.²² For the statistical analysis, the averages obtained are divided into two categories: 0, which ranges from 1 to 3 and 1, which covers from 3.5 to 5.

3) Language Exposure Patterns in the Home.

The language employed in interactions with the spouse, and/or as a family may not be the same as the language spoken to the child. The third variable comprises parental choice of language in the home in these terms. The choice of language in a familial environment: (a) with the spouse, (b) as a family (triadic interactions) and (c) with the child separately (dyadic interactions) can be, for the participant families in this study, English, Spanish or the alternative use of both languages. These qualitative values represent the kind of linguistic input that the child receives from each parent in the home. These data can be measured as the quantity of each language used at home.

²² **This information refers to the time of data collection and was inferred from the interviews with the parents and my own observations during my visits with the families. It will be further contrasted with the actual parental linguistic behavior revealed through the analysis of the recorded data.**

Spanish is considered as the dominant home language when both parents use the minority language with the child and as a whole family, while English is deemed the home language when the one parent-one language strategy is employed and the language of family interactions is the community language. However, to better carry out the statistical analysis, language exposure patterns in the home are classified independently according to the language of use of each parent with the child.

4) Time Under Parental Supervision.

Tabulating the time that the child spends with each parent reveals the potential overall amount of exposure to English, Spanish and mixed input in the home according to language exposure patterns. This information is especially important in determining the total amount of contact the child has with the minority language, particularly if the parent(s) are the only source of Spanish input. The time that each parent spends with the child on a daily basis, according to the parent's declarations, is measured in the number of weekly hours. The percentage of time the child spends with each parent and with both parents together is calculated with respect to the overall sum of waking hours, in which the child can be exposed to linguistic input. Although these amounts may change over time, the average estimate obtained during the period of data collection is implemented for the analysis. Parental reports serve as the basis for the calculation projecting the children's exposure to language input as an average of 70 hours per week. The average time that each parent spends with the child is encoded as a binary alphabet, with the categories "0" corresponding to 1-50% (which

equals less than 5 hours a day); and “1” for 51-100% of the time (equivalent to more than 5 hours a day).²³

5) Language Exposure Outside the Home.

While this study focuses on language used in the home, it is useful to examine the amount of input the child receives from external sources, as well. Child participation in preschool and playgroups supplies significant input from one (or both) language(s) and influences the communicative needs of the child. Variable # 5 is expressed as exposure to language(s) and the number of hours the child spends away from main caretakers daily. Under the same rule as variable 4, the percentage of weekly time a child is exposed to each language is calculated. The amount of exposure to each language outside the home is assessed quantitatively. Only the period in which the child is exposed to the minority language away from home is analyzed to determine any difference in the general amount of exposure to Spanish. Time away from the parents in which the child is exposed to one particular language 50% or less overall is encoded as “0”, while more than 50% is assigned a value of “1”.

6) Parental Language Input in Conversation.

In this analysis it is considered that the input language in which a conversation takes place dictates the appropriateness of the language of response. Language medium is usually contingent on the language exposure patterns in the home, but in some circumstances parental choice of language may diverge, depending on the

²³ It needs to be taken into account that all parents in the study work outside the home.

interlocutors present or the activities and topics in the conversation. A parent's interest in bringing up the child as a bilingual (variable 2) is directly proportional to the likelihood that the parent is more or less consistent in providing minority language input to the child. This variable, Parental Attitudes, correlates with the amount of language the adult is likely to use with the child. Data analysis monitors how successfully the children's utterances correspond to those of the interlocutor, with regards to language choice patterns.

The analysis consists of a sequential turn-by-turn breakdown. Turns corresponding to dyadic and triadic interactions (child conversations with each parent and with both parents together) in all recordings are added and classified according to language.²⁴ Only child turns which follow a parent's initiating turn are included in the analysis, that is, child turns which together with parental turns form adjacency pairs (cf. Lanza 1997: 204). The base language of conversation (Myers-Scotton 1993, Lanza 1997) for the participants is assessed according to three types: Spanish, English and mixed conversations. The language of the conversation is ascribed based on the absolute majority of the initiating turns articulated by the parent(s) in one specific language or mixed languages in each recording session. Subsequently, the absolute number of turns is computed per language and per type of interaction (dyadic or triadic), and is broken down into percentages. The results obtained from adding all the percentages (of turns) of parental language use (English/ Spanish/ mixed) in all

²⁴ A turn in a conversation consists of a particular stretch of time during which one person is speaking, bounded either by silence or talk by another speaker (see Sacks, Schegloff & Jefferson 1974 for an account of turn-taking organization in conversation). Only turns with verbalizations (utterances) are considered. Attributable silences are not regarded as turns in the macro analysis, whereas minimal responses (yes/no answers, exclamations, interjections of the type *uhum*, etc.) are only included when they can be clearly attributed to one of the languages, either English or Spanish.

the recordings represent the amount of linguistic input the child receives in the home according to the data, and correlate with independent variable # 3 (Language Exposure Patterns). The reason behind maintaining the separation of these two interrelated variables is to observe the correlation between the language that the parents perceive is being used in family interactions and the language that they actually use in the recorded conversations. For statistical purposes, the turn count is tallied longitudinally by grouping the recording sessions into monthly increments, according to the age of the child.

7) Context / Activity of Conversation.

The purpose of considering the contextual variable is to observe if parental language use changes through different conversational contexts. The contexts / activities are classified into: a) free conversation, which includes playing, meals, getting ready (for bed, to go out) and chatting; and b) story telling, as a general term to cover story reading and telling, including rhymes and numbers, and singing. With respect to language choice, story telling is a more highly controlled situation; depending on in which language the story is read (the song is sung, etc.). It may diverge from the accustomed language the parent uses with the child. This variable is catalogued in absolute percentages with respect to the total amount of data collected. The amount of speech in conversation for each context is classified for each parent separately and for both parents together (as an average, independently from the amount of input from each parent), in order to have a more complete overview of the incidence of context on language choice.

8) Topic of Conversation.

This aspect is included with the aim of observing whether language selection changes according to topic of conversation. It is catalogued based on the data collected.

Depending on the activity, various conversational themes may be dealt with. Some specific cultural themes can be the focus of the conversation, and a specific language selection may be made for individual topics. For reasons of expediency the topics of conversation are condensed into two general categories: a) culturally-neutral topics (with no value attached to a specific culture) and topics related to the minority culture, including reference to Spanish-speakers and non-English-speaking persons, places outside of the United States, Spanish-speaking television and book characters; and b) topics related to the community culture, which include festivities (Halloween, Christmas, etc.), birthdays, places in the United States, English-speaking persons as well as anglophone television and book characters. The tabulation of this variable is identical to variable # 7.

9) Parental Response to Child's Mixing and/or Inappropriate Choice of Language.²⁵

This aspect complements parental language input and provides information on the effects of parental feedback when the child mixes and/or makes inappropriate language choices in particular conversational exchanges. Lanza (1997) postulates that parents employ strategies towards child language mixing in discourse, thus construing a monolingual or bilingual context with the child that may influence the child's

²⁵ See explanation of "appropriate" choice of language as response to input in chapter 4, section 4.1.2.

subsequent choice of code. This variable is categorized qualitatively according to a classification of parental strategies adapted from Lanza (1992) and Mishina (1999). Figure 5.1 depicts the categorization applied in the current study along Lanza's monolingual-bilingual context continuum.

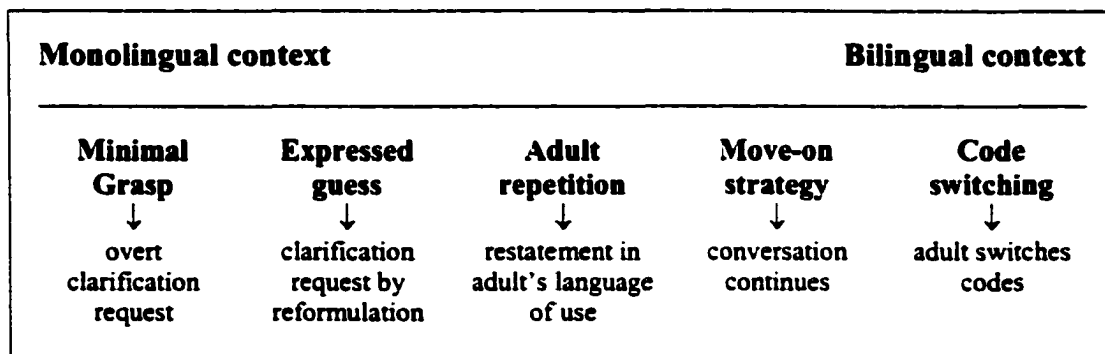


Figure 5.1 Parental Discourse Strategies towards Child Code Mixing

The categories are quantified as: 1= minimal grasp, 2= expressed guess, 3= adult repetition, 4= move-on strategy and 5= code-switching. At a deeper level of examination, these strategies are measured in percentages of frequency with respect to their categorical distribution. For the statistical analysis, the five categories are reduced to two basic tendencies: attempt to correct the child (1 and 2) or acceptance of the child's utterance (3 to 5).

In sum, the above-mentioned independent variables encompass input conditions, that is, the (external) linguistic circumstances affecting the child's exposure to each language. These aspects are overwhelmingly liable to parental behavior in the child's presence. Dependent variables, on the other hand, relate to the child's response and development influenced (if hypotheses prove right) by the independent variables.

5.2 Dependent variables

Dependent variables analyze child bilingual behavior with respect to bilingual linguistic competence and language use. Table 5.2 offers an outline of these variables:

DEPENDENT VARIABLES (child behavior)		
SOURCE	FOCUS	VARIABLE
Conversational Data (empirical)	Linguistic (bilingual) Competence	Grammatical Complexity (MLUmorph./word; MLUmax)
		Lexical Diversity (TTR; VOCD)
		Morphosyntactic Development (linguistic milestones)
	Language Use	Code of Response to Input Language in Conversation
		Amount of Mixing of Child Codes in Conversation

Table 5.2 Summary of Dependent Variables

Dependent variables consist of:

1) Child's bilingual competence.

Residing within performance data, the degree of language ability is determined and compared to monolingual rates in order to assess bilingual development in the subject. To date, a reliable measurement of child bilingual competence is not available. To the extent that the rate of linguistic development in a simultaneous bilingual may be comparable to that of her/his monolingual peers, the current study uses proficiency measurement methods already tested on monolinguals.²⁶ The *utterance*, identified by a single intonational contour (cf. Lanza 1997: 124), is the unit of analysis to measure:

²⁶ See Genesee (2001) for an overview of studies that compare bilingual to monolingual development.

i. **Grammatical Complexity (MLU in morphemes and words; MLU_{max}).**

Brown's (1970, 1973) categorization, based on the *mean-length-of-utterance* (MLU), to test grammatical complexity in English-speaking monolinguals, is employed. As bilingual linguistic competence can only be measured through observable performance (Nicoladis & Genesee 1996), the child's grammatical competence is assessed in natural speech, based on morpheme calculation (MLU_m) as well as word calculation (MLU_w) of the child's utterances for each language separately.²⁷

The method of word count is employed as an additional source of information to Brown's MLU measurement, based on morpheme count, due to the problematic nature of morpheme computation. Not only can a morpheme count be carried out in different ways that can lead to a misinterpretation of data and data comparison, but also the languages under study contain a dissimilar number of morphemes with respect to each other. The criteria chosen for morpheme count corresponds to the norms outlined in Brown (1973: 54) for English utterances. Researchers on child bilingualism (for instance Döpke 1992, 2000 and Lanza 1997) apply Brown's measurement to their analyses with certain modifications. Lanza's criticism points out that MLU as an index of grammatical development in the child fails both to capture the different semantic combinations within the utterance and to explain whether length of

²⁷ The criteria used in this study for word computation is based on orthographic boundaries. Mixed utterances are not considered in the count due to their complex nature. Measuring each language separately and leaving mixed utterances out of the count does not presuppose the assumption that a bilingual speaker is the sum of two monolinguals. On the contrary, the concept of language system in terms of modularity suggests that bilinguals and monolinguals organize and process linguistic information in dissimilar ways (see third chapter for a detailed account of this matter).

utterance can actually be compared to linguistic complexity or not. Similarly, I use Brown's MLU with caution, as a measuring device for English utterances inasmuch as it suits the purpose of the current analysis.

The chosen criteria to calculate MLU for Spanish utterances is outlined in Siguán, Colomina & Vila (1990: 56). Schnell de Acedo (1994) emphasizes the dangers of making arbitrary decisions in devising morpheme-counting rules for non-English data. Brown's (1973) index has been altered in its application for other languages via revisions of morpheme counting rules (for instance, Linares 1981 for Spanish) or MLU computations based on word count (Hickey 1991 for Irish). In my view, Siguán et al. (1990) designed the most accurate morphemic calculation of MLU for Spanish to date. Quay (1995a) and Deuchar & Quay (2000) also apply these rules for morpheme count in their data.

To my knowledge, as of now no consensus has been reached among researchers in the field regarding the equal measurement of MLU across languages and the appropriateness of carrying out the analysis on the account of morphemes or words, due to the different nature of the languages in question. Recent studies (for instance Sinka 2000) use, although separately, both dimensions (MLU of morphemes and of words) within the same analysis. Using this procedure, the results from the data analysis in the current study can be straightforwardly compared to those of other studies regardless of the type of MLU measurement applied.

A sample of 50 utterances (following Miller 1981, Pan 1994, and others) is extracted from each group of recordings and the MLU is calculated for

morphemes and words with the help of CHILDES' software program CLAN. Imitations, repetitions and yes/no answers are excluded from the sum (per Wells 1985) to measure actual child competence in production.

The five most complex sentences uttered in the complete recording sessions for each month receive a morphemic and word MLU analysis (MLU_{max} in morphemes and words), in order to establish "the upper limits of the child's production at a given point in time" (see Solokov & Snow, 1994: 32 and Wells 1985). For organizational purposes, the data are structured by grouping the recording sessions by the age of the child in monthly increments.

ii. Lexical Diversity (TTR; VOCD)

Parameter D denotes lexical diversity in the instrument designed by Malvern and Richards (1996) based on the TTR (Type-Token Ratio) index from Templin (1957). Since TTR is computed by dividing the number of different words a speaker uses by the total number of words produced in a speech sample, this index tends to decrease with growing token size. VOCD is a linear transformation that allows for increasing lexical diversity over time (as children's vocabulary expands). The speech sample chosen for analysis in the present study corresponds to MLU measurement of 50 utterances from each group of recordings (as in Miller 1981). Both measurements for lexical diversity, TTR and VOCD are calculated with the assistance of CLAN.

A problematic issue with respect to MLU measurements is that both morpheme and word count can be carried out in many different ways. Until

well-defined analysis criteria and a methodological consensus are arrived at, an unspecified MLU analysis can provide misleading interpretations of external data from the literature. Lexical measurements such as TTR lead to both similar and different challenges. For instance, word repetition (the determiner factor for TTR scores) may depend on input conditions such as parental inquiries, child's disposition (mood, tiredness), speech functions (see Finnerty 1991-1995), etc. While I consider TTR to be a more efficient measure in open-word categories, I adopt the criteria of calculation given by Templin (1957) for this particular kind of lexical measurement.

iii. **Morphosyntactic Development (Linguistic Milestones)**

Each child's morphosyntactic development is measured using previously existing scales of grammatical development in monolinguals (Miller 1981 for English and Hernández-Pina 1990 for Spanish). The complete summary of structures included in the analysis is contained in Appendix H.

The results from the analyses to test grammatical complexity, lexical diversity and morphosyntactic development corresponding to the subjects in this study are directly compared to data from normally developing monolinguals published in the literature, with the purpose of evaluating whether the rate of development in each language is equivalent to monolingual standards. For comparing grammatical complexity and lexical diversity the data used for Spanish comes from the subjects María (López-Ornat 1994) and Koki (Montes 1987,

1992); and for English from Adam and Sarah (Brown 1973). The data basis stems from CHILDES system and the analyses are carried out in the same way as for the subjects in this study, using the software program CLAN.

The morphosyntactic development for Spanish is weighed against the results from subjects from several studies: Rafael (Hernández Pina 1990), María (Mueller Gathercole, Sebastián and Soto 1999), María (Fernández 1994) and Peru (Meisel 1994b), whereas the results from English originate from the linguistic milestones on Miller (1981).

One single type of analysis can be insufficient for determining the degree of bilingual competence (De Houwer 1999, Hamers & Blanc 2000). By using dual measurement methods (for grammar and lexicon) greater accuracy can be expected.²⁸

2) Child's Code of Response to Input Language in Conversation.

Essentially, variable # 2 reflects the subject's choice of code with each parent according to how the conversation unfolds. Consequently, it can serve to evaluate the appropriateness of response to parental input. An appropriate response from the speaker would be such that it complies with the language used by the interlocutor. In cases of parentally elicited speech, as is most frequent in family conversations with very young children, this situation should comply with the language used by the parent(s). The child's code of response to the input language of the conversation is

²⁸ Phonetic adequacy (how well the child's pronunciation of the word corresponds to the adult standards for that particular language) is not taken into consideration to assess linguistic competence unless cases of extremely deviant phonology are observed.

also measured in turns. Depending on the language in which the conversation takes place, one particular choice of code from the child is expected to comply with the language used by the parent(s). In every recording session the parents have employed elicitation techniques (e.g. question asking) to induce child speech. I therefore assume that the choice of language made by the parent is the customary language spoken by that person with the child (in that specific context). Accordingly, the code is deemed the language of that particular conversation whereby child utterances are considered responses to parental elicitation, unless otherwise evidenced. Child-initiated sequences are regarded separately if they present differences with respect to elicited speech. In direct comparison with parental input, only responses to parents' elicitation are tallied in this variable. Ultimately the language of the conversation is determined, as mentioned above, by the majority of the initiating turns, customarily coming from the parents.

Using the *conversational turn* as a unit of analysis, the measurement of the child's language choice takes place in several steps:

- i. Percentages of the child's turns with Spanish, English and mixed utterances in conversations with each parent and with both parents together are calculated. Mixed utterances are classified within the utterance and within the turn (across utterances).
- ii. Resultant values obtained by calculating the average percent of language use of one particular language, e.g. Spanish, in the parent's turn initiators are plotted against the amount of Spanish used in the child's turns. In dyadic interactions, percentages of language use are calculated for each parent separately and for the

child, whereas in triadic interactions the speech of each parent is extracted and added to that of dyadic interactions. The exchanges between the parents themselves are disregarded.

- iii. Absolute percentages are calculated and a comparison of responses with parental input is carried out to determine the percentage of language use correspondence (compliance with input language) in child-parent interactions.
- iv. Statistical significance tests are run to check the correlation of appropriate language use of the child with respect to the parental input for each parent separately, as language of communication between each parent and the child may be different. No special distinction is made for dyadic and triadic interactions at this point. Each parent's choice of language of interaction with the child alone and together as a family is already included in the amount of input the child receives from each parent in percentile form.
- v. Different contexts/activities in which the recordings take place are evaluated for each child to find similar or dissimilar patterns.
- vi. Different conversational topics are taken into account to detect differences in language use.

3) Amount of Mixing of Child Codes in Conversation.

Calculation of mixing of codes as used by the child in conversation takes place at the turn level with respect to parental turn initiators.²⁹ Language selection that does not correspond to that of the parental last utterance of the turn in a minimal pair is

²⁹ The reader is referred to the definition and classifications of "mixing" of child codes in chapter 2, section 2.4.4.

considered mixing (and consequently, inappropriate choice of code). In order to avoid overlapping in the count, turns containing one or more mixed utterances (at the internal utterance level) are computed as “utterance mixing”, while turns containing utterances in different codes (at the internal turn level) are considered as “turn mixing” (within turns). Research studies on bilingual acquisition estimate that their normally developing subjects display about 4% of mixing in their speech.³⁰ Considering possible differences in the assessment of language mixing in bilingual children, I have allowed a 5% plus or minus difference and considered this as the normal range to measure against results from the subjects in the current study. This means that a mixing rate of 10% or above is considered as not comparable to the norms.

The dependent variables as described above comprise the child’s linguistic response(s) to parental input as represented by the independent variables. If the proposed hypotheses prove correct, the child’s bilingual development and choice of code in conversation in the home is highly influenced by the parental linguistic behavior. While this point has been tacitly assumed in the literature, it can now be concretely demonstrated based on empirical and statistical evidence. Upon continuation, results of the different participant children and parents in the study are summarized as a means of direct comparison of the data. Finally, all experimental variables are analyzed statistically using logistic and multiple regressions as a way to discern which are most relevant for

³⁰ While Swain & Wesche (1975), Lindholm & Padilla (1978) and Redlinger & Park (1980) indicate that only 2-4 per cent of utterances in early bilingual productions are mixed, according to De Houwer (1990), 6.5% of utterances are mixes. In the current analysis mixing percentages are based on the total number of turns and not of utterances. Nevertheless, child turns within this age range are often composed of one single utterance and, consequently, mixing percentages can be reasonably compared to those found in the literature.

testing the proposed model. Chapter 6 includes a detailed description of the statistical models implemented in the analysis. The independent variables that better predict the dependent ones will be evaluated and, in a subsequent chapter, further tested against data from one subject (an English/Spanish bilingual) out of the CHILDES data pool.

5.3 Summary

This chapter offered a detailed account of data analysis methods employed in the study. Nine independent variables represent input conditions at home and comprise a diversity of aspects of the parental situation, such as linguistic competence, social and psychological predisposition, home language setting and input in conversation. Dependent variables analyze child bilingual behavior in both aspects of language differentiation: grammatical competence (by way of several tests for development in the different linguistic modules) and language use (examining the code of response to parental elicitation). Results are displayed in the next chapter in addition to pertinent statistical analyses in order to construct and further test a model of analysis and prediction of bilingual child speech.

CHAPTER 6

RESULTS

This chapter presents the results from the analysis of the recorded conversational data and the subsequent statistical testing. Section 6.1 contains 190 tables corresponding to the analysis of data grouped by subject, together with a summary of tables comparing results from all the children. Observations on the data results close the first section, while 6.2 encompasses the statistical analysis, listing the variables considered and the relationships among them. Finally, an evaluation of the results obtained in the statistical analysis is provided in 6.3. An explanatory analysis, supplementing the descriptive analysis in the current chapter, is provided in chapter 7.

6.1 Tabulation of variables

The following tables are classified according to subject. The order in which they appear is dependent upon the amount of data collected from each child (ascending). The dependent variables are followed by the independent ones, and numbered according to the list of variables in the previous chapter. Abbreviated forms are used in the names of the individuals, following the model given in CHILDES.

On the whole, tables 6.1 to 6.5 consist of preconditions for the child's linguistic development, which include parental background information and patterns of language exposure. Results from the analysis of conversational data from parental input are set out in tables 6.6 to 6.9b. Dependent variables are tabulated as follows: 6.10 to 6.19 contain figures about the subjects' competence in each language; tables 6.20 to 6.23 compare the children's responses to parental input language in conversation; and table 6.24 overviews

the amount of mixing of child codes in conversation. Since the amount of mixing of Spanish in an English conversation was observed to be very limited, the amount of mixing in the tables is considered in general, without specifying directionality of language switch. Tables 6.25 and 6.26 summarize the classification of all variables that pertain to Spanish and English respectively.

Chapter 5 offered a complete and detailed explanation of how the information contained in the variables is tabulated. Section 5.1 presented an account of the independent variables (tables 6.1 to 6.9b) and section 5.2 elucidated the contents of the dependent variables (tabulated in 6.10 to 6.24). The following account outlines what the figures in the tables stand for:

Independent variables:

- Table 6.1 presents information on parental linguistic competence in English and Spanish for individual parent. The levels of competence in the areas of syntax, phonetics and lexicon are evaluated independently and then averaged in a separate column, based on a scope from 5=native to 1=novice. For statistical purposes, values between 1 and 3 are further classified as “0” and values between 3.5 and 5 are listed as “1”.
- Table 6.2 indicates parental attitudes to child bilingualism according to degree, ranging from 5=very high to 1=minimal. For statistical purposes, the same binary classification as in table 6.1 applies.
- Table 6.3 gives information on the language exposure patterns in the home. “0” represents English and “1” Spanish. Only the results contained in the second column (Language with Child) are relevant for the statistical analysis.

- **Table 6.4 shows the amount of time children spend with each parent separately on a weekly basis. The first three columns display the approximate number of hours per day on weekdays, weekends, and on average respectively. The fourth column provides a distributional percentage of the total time spent weekly with each parent, considering the children have 10 waking hours a day. This percentage is classified in the last column for statistical use as “0” for 50% or under and “1” for 51% and up.**
- **Table 6.5 charts the amount of English and Spanish input children receive outside the home away from their parents. The measurements selected are equivalent to those in table 6.4. The number of weekly hours appears in the first column, while columns two and three show, respectively, the percentage of time outside the home with regard to the weekly (waking) time overall, and an absolute percentage of the total of the time outside the home (showing the distribution between the time spent exposed to English and to Spanish).**
- **Tables 6.6 to 6.8 contain information from conversational data on the amount of parental language use in form of absolute percentages of the computed turns (parent-child adjacency pairs), separated into mother and father. The percentages (adding up 100% per parent) are divided into Spanish, English and mixed turns containing both languages. Mixing is subdivided into mixes within turns and mixed utterances. Table 6.6 presents a general overview of the parental use of Spanish, English, and language alternation, while 6.7 offers a distinction between conversational contexts (or activities), classified into free conversation and story reading. Table 6.8, in turn, shows a categorization by topic of conversation, classified into topics which are**

culturally neutral or related to the minority culture (n/Sp), and topics associated to the culture of the wider community, English (Eng).

- Tables 6.9a and 6.9b tabulate parental strategies as a response to children mixing codes or taking the inappropriate choice of code with respect to the language used by the parent. Section 1 in chapter 5 (Independent variable 9) contains a figure listing a classification of strategies (adapted from the literature) and a brief explanation of each category. Table 6.9a provides a detailed account tallied in percentages of occurrence corresponding to each of the parental strategies, based on the times they occur, i.e. the total number of strategies employed corresponds to the absolute amount of child mixes (at the utterance level, within turns, and across turns). Table 6.9b classifies the results of 6.9a into two ways, corresponding to a general trend of acceptance or to an attempt to correct by the parents.

Dependent Variables:

Tables 6.10 through 6.23, related to dependent variables (child's linguistic competence and use), include a binary classification in the last column that indicates the results of comparing the subject's data to other normally-developing monolinguals (Spanish or English) from the literature (see 5.2). "1" denotes that values from the subject's data are comparable to monolingual data, and "0" means that they are not. Comments on data characteristics and background information particular to a specific time during data collection are added to the tables when deemed relevant.

- Table 6.10 and 6.11 contain figures representing the child's grade of grammatical complexity (measured in MLU) in Spanish and English respectively. MLU

measurements are given in each language corresponding to those ages (on a monthly basis) for which data is available, based on the first 50 utterances recorded (as described in chapter 5). The values given denote: 1) MLU calculated in number of morphemes and number of words; and 2) MLUmax (the 5 longest utterances) also measured in morphemes and words. As previously stated, tallying MLU both in morphemes and words facilitates comparison with results across subjects from the current study and from the literature. MLUmax measurements reveal the limits of sentence production in the speaker.

- Tables 6.12 and 6.13 display lexical variety (in Spanish and English respectively), arranged by age, offering the following information: 1) types and tokens; 2) traditional TTR measurements (Templin 1957); and 3) VOCD scores (Malvern and Richards 1996).
- Tables 6.14 and 6.15 summarize significant linguistic milestones in the development of morphosyntax, in each language respectively, based on monolingual acquisition studies. Information about the age (in months) of emergence of each morphosyntactic structure considered for Spanish is given for four subjects in the literature, as a basis for a comparison of the results from the subjects in the current analysis. Age ranges are given as an orientation towards evaluating the scope in which emerging morphosyntactic structures in English appear in monolinguals.
- Tables 6.16 and 6.17 summarize linguistic competence measurements in Spanish and English correspondingly.
- In tables 6.18 and 6.19 the information on linguistic competence from the previous tables is grouped into three age blocks, corresponding to 2;0-2;4, 2;5-2;9, and 2;10-

3;3 respectively. This arrangement facilitates the statistical analysis across subjects and yet maintains the longitudinal character of the current study.

- **Tables 6.20 through 6.23 tabulate the distribution of child turns in conversation according to language (Spanish, English or mixed speech) compared to parental results. As in tables 6.6 to 6.8, values are given in percentages over the total number of turns in the recordings. Table 6.20 presents a general count and 6.21 breaks down the information into the three age blocks mentioned above. Whereas table 6.22 provides a breakdown of percentages of turns by context of conversation (free conversation and story reading), 6.23 displays the percentages by topic of conversation (culturally neutral/Spanish culture and English culture), as in tables 6.7 and 6.8.**
- **Table 6.24 summarizes the percentages of mixed speech with respect to the total amount of turns from the child. The first column contains the percentage of turns in which mixing appears, within turns and across turns, i.e. a change of code in a particular turn that does not correspond to the (turn initiating) parental choice of language. The second column presents the percentage of mixing at the utterance level, that is, the percentage of turns containing one or more (internally) mixed utterance. Percentages corresponding to turns and utterances are added and averaged. The results are classified according to the mixing rates found in the literature. Considering an approximate mixing rate of 4% in normally developing bilinguals, and allowing for a percentile difference of $\pm 5\%$ across subjects, a mixing rate of 10% or above is considered as not comparable to the norms, and therefore classified as “0”, whereas a**

rate of mixing below 10% is categorized as “1”, and therefore within the normal range.

- Finally, tables 6.25 and 6.26 summarize all variable classifications that are pertinent to the upcoming statistical analysis.

6.1.1 Carla

INDEPENDENT VARIABLES

Preconditions

Parental background

Parental background classifications (Class.) are listed for statistical computation as binary measures, with Classifications indicating proficiency between 1 and 3 listed as 0, while Classification between 3.5 and 5 is assigned a value of 1.

PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average Level	Class.
M	E	4	3	4	3.5	1
	S	5	5	5	5	1
F	E	5	5	5	5	1
	S	3	4	4	3.5	1

Key: Parent: M=Mother; F=Father
Language: E=English; S=Spanish
Level: 5=naive; 4=superior; 3=advanced; 2=intermediate; 1=novice; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.1 (CAR) Parental Linguistic Competence in each Language

PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
M	5	5	5	5	1
F	5	5	4	4.5	1

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.2 (CAR) Parental Attitudes to Child Bilingualism

Language exposure

PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
M	1	1	1	1	1
F	0	1	1	1	

Key: 0=English; 1=Spanish

^a Language exposure patterns are listed for statistical computation as binary measures. English is listed with the classification 0, while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 6.3 (CAR) Language Exposure Patterns in the Home ^a

PARENT	Weekdays ^a	Weekends ^a	Week Average ^a	% of Weekly Time	Class.
M	6	10	7	70	1
F	4	10	6	58	1

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 6.4 (CAR) Time Under Parental Supervision

LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
E	10	15	50	0
S	10	15	50	0
Total	20	30		

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 6.5 (CAR) Language Exposure Outside the Home

Conversational data

Language exposure

PARENT	Spanish	English	Mixing		
			Total	Turn	Utterance
M	95	2	3	3	0 ^b
F	92	3	5	4	1
Average	93	3	4	3	1

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
 ^b less than 1%

Table 6.6 (CAR) Parental Language Use in Conversation (by Parent)^a

PARENT	Context	Spanish	English	Mixing		
				Total	Turn	Utterance
M	free c. story	97	1	2	2	0 ^b
		89	5	6	5	1
F	free c. story	95	2	3	2	1
		84	8	8	7	1
Average	free c. story	96	1	3	2	1
		86	7	7	7	0

Key: Context: free c.=free conversation
 story=story reading

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%

Table 6.7 (CAR) Parental Language Use in Conversation (by Context)^a

PARENT	Topic	Spanish	English	Mixing		
				Total	Turn	Utterance
M	n/Sp	97	1	2	2	0 ^b
	Eng	78	7	15	12	3
F	n/Sp	96	2	2	2	0
	Eng	66	15	19	16	3
Average	n/Sp	97	1	2	2	0
	Eng	72	11	17	14	3

Key: Topic: n/Sp=culturally neutral / minority culture

Eng=related to community culture

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.8 (CAR) Parental Language Use in Conversation (by Topic)^a

PARENT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
M	3	3	4	43	47
F	2	3	4	36	55
Average	2	3	4	40	51

Key: ^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9a (CAR) Parental Response to Child's Mixing (by Parent)^a

PARENT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
M	10	90	0
F	9	91	0
Average	9	91	0

Key: Trend: 0=acceptance; 1=correction

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9b (CAR) Parental Response to Child's Mixing (by Trend)^a

DEPENDENT VARIABLES

Conversational data

Linguistic competence

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	2;0	2.50	1.98	4.0	3.4		1
2	2;1	2.38	1.68	6.4	4.6		1
3	2;2	2.88	2.38	7.2	5.4	Upon return from Spain	1
4	2;3	3.46	2.72	8.2	5.4	Grandmother from Spain	1
5	2;4	4.18	3.44	9.6	7.6		1
6	2;5	3.96	3.00	8.8	5.6	Visit to Grandpar. (USA)	1
7	2;6	4.94	3.82	11.8	9.6		1
8	2;7	5.38	4.20	13.2	11.8		1
9	2;8	4.62	3.62	8.8	6.6		1
10	2;9	3.68	2.74	6.0	5.2		1
11	2;10	4.42	3.54	9.2	7.6		1
12	2;11	4.94	3.50	10.8	7.8	Upon return from Spain	1
13	3;0	4.92	3.86	13.8	11.6	Grandmother from Spain	1
14	3;2	5.26	4.14	14.6	12.2		1
15	3;3	5.78	4.02	12.4	9.6		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.10 (CAR) Grammatical Complexity in MLU Classifications (Spanish)

Recording Session Group	Age	MLU		MLUmax		Class.
		morphemes	words	morphemes	words	
1	2;0					
2	2;1					
3	2;2					
4	2;3					
5	2;4					
6	2;5					
7	2;6					
8	2;7					
9	2;8					
10	2;9					
11	2;10					
12	2;11					
13	3;0					
14	3;2	5.35*	4.65*	7.2*	7*	1
15	3;3	4.94	4.42	10.0	9.4	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.11 (CAR) Grammatical Complexity in MLU Classifications (English)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Comments	Class.
1	2;0	53/99	.53	29.83		1
2	2;1	62/93	.66	65.02		1
3	2;2	65/119	.54	53.86		1
4	2;3	69/136	.50	45.92		1
5	2;4	88/171	.51	55.12		1
6	2;5	90/152	.59	77.77		1
7	2;6	84/193	.43	52.70		1
8	2;7	97/213	.45	47.42		1
9	2;8	78/182	.42	27.59		1
10	2;9	77/137	.56	59.49		1
11	2;10	98/183	.53	70.76		1
12	2;11	88/182	.48	59.70		1
13	3;0	59/195	.30	20.09	Describing pictures	0
14	3;2	106/209	.50	62.47		1
15	3;3	95/206	.46	57.86		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.12 (CAR) Lexical Variety in TTR & VOCD Classifications (Spanish)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Class.
1	2;0				
2	2;1				
3	2;2				
4	2;3				
5	2;4				
6	2;5				
7	2;6				
8	2;7				
9	2;8				
10	2;9				
11	2;10				
12	2;11				
13	3;0				
14	3;2	49/89*	.55*	33.77*	1
15	3;3	99/217	.45	45.31	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
*Based on less than 50 utterances (20 and up)

Table 6.13 (CAR) Lexical Variety in TTR & VOCD Classifications (English)

Age Range			2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0	Om
S T R U C T U R E	Noun Phrase	N (plural)		X	o											1
		Det + N (pl., fem.)					X			o						1
		(Det) + N + Adj		o	X											1
	Verb Phrase	Present ind. hab. (sg/pl)	X o	o												1
		Present ind. continuous		X	o		□									1
		Pres. Perfect		o	□											0
		Preterit			X o□											1
		Imperfect				o □		X								1
		Imp. cont.												o	X	1
		Periphrastic future	o		o		X □									1
		Reflexive <i>se</i>				o	X									1
		Impersonal <i>hay</i>	o		X											1
		Imperative Negative		X o												1
		Present Subjunctive							o □		X					1
	Negation	<i>no</i> + V	X o													1
		<i>no</i> + Adj.	*		X											1
		Subj. + <i>no</i>	o		X											1
		<i>no</i> + V + Obj.			X o											1
		Subj. + <i>no</i> + V + Obj.				X		*								1
	Wh- Ques.	Wh + V		o		X										1
		Wh + V + Obj.						X	o							1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 ind.=indicative
 hab.=habitual
 X = Carmen
 o = Rafael (Hernández Pina 1990)
 □ = María (Mueller Gathercole, Sebastián and Soto 1999)
 ◇ = María (Fernández 1994)
 * = Peru (Meisel 1994b)

Table 6.14 (CAR) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Ling. Stage ^a		1	2	3	4	5	Class
Age Range		1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5	
S T R U C T U R E	Noun Phrase	(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4	1
	Age ^b	2;0	2;0 ^c /2;5 ^d	2;0/2;7	2;9		
	Verb Phrase	Lone verb	Marked v. '-ing' w/out <i>be</i> or catenative	Pres. Aux <i>can, will, be</i>	Main V and Aux in Past. Past modals	Past <i>be have</i> + -en Aux + NP	1
	Age	2;0	2;6	2;9	—	3;2	
	Negation	<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be, can, will, do, does.</i> Past <i>did</i>	Past tense and modals Cat + NP <i>be</i> + -ing	1
	Age	2;7	2;7	—	2;9	3;3	
	Yes/No Ques.	Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be, can, will, do</i>		1
	Age	—	—	—	2;9		
	Wh-Ques.	<i>what</i> + (<i>this/that</i>) <i>what</i> + (NP) + <i>do</i> + (-ing) <i>where</i> + (NP) + <i>go</i> + (-ing)	<i>what</i> + (N) + V <i>where</i> + (N) + V	Aux without inversion. <i>Why, who, how</i>	<i>Do...?</i> Aux inverted. <i>Be, can, will, do. When...?</i>		—
	Age	—	—	—	—		

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 — = no evidence found in the data

^a Linguistic stages according to Brown's labels (1973)

^b Age in which the form appears and/or becomes regularized

^c Form appears only once in the data

^d Form becomes regularized

Table 6.15 (CAR) Morphosyntactic Development in English (Based on Miller 1981)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;0	2.50	1.98	4.0	3.4	.53	29.83	Pres. ind. hab.; Neg.	1
2	2;1	2.38	1.68	6.4	4.6	.66	65.02	NP; Pres. c.; imp.neg.	1
3	2;2	2.88	2.38	7.2	5.4	.54	53.86	NP; Pret.; <i>hay</i> ; Neg.	1
4	2;3	3.46	2.72	8.2	5.4	.50	45.92	Neg.; Wh-Q	1
5	2;4	4.18	3.44	9.6	7.6	.51	55.12	NP; Per. fut.; Refl. <i>se</i>	1
6	2;5	3.96	3.00	8.8	5.6	.59	77.77	Imperfect; Wh-Q	1
7	2;6	4.94	3.82	11.8	9.6	.43	52.70		1
8	2;7	5.38	4.20	13.2	11.8	.45	47.42		1
9	2;8	4.62	3.62	8.8	6.6	.42	27.59	Present Subjunctive	1
10	2;9	3.68	2.74	6.0	5.2	.56	59.49		1
11	2;10	4.42	3.54	9.2	7.6	.53	70.76		1
12	2;11	4.94	3.50	10.8	7.8	.48	59.70		1
13	3;0	4.92	3.86	13.8	11.6	.30	20.09	Imperfect continuous	1
14	3;2	5.26	4.14	14.6	12.2	.50	62.47		1
15	3;3	5.78	4.02	12.4	9.6	.46	57.86		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.16 (CAR) Summary of Linguistic Competence Measurements (Spanish)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;0							NP (1,2,3); VP (1) ^a	1
2	2;1								
3	2;2								
4	2;3								
5	2;4								
6	2;5							NP (2)	1
7	2;6							VP (2)	1
8	2;7							NP (3); Neg (2)	1
9	2;8								
10	2;9							NP(4)VP(3)Neg(4)y/n(4)	1
11	2;10								
12	2;11								
13	3;0								
14	3;2	5.35*	4.65*	7.2	7	.33*	33.77*	VP (5)	1
15	3;3	4.94	4.42	10.0	9.4	.44	45.31	Neg (5)	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

^a Corresponding linguistic stage

* Based on a number of utterances less than 50 (20 and up)

Table 6.17 (CAR) Summary of Linguistic Competence Measurements (English)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	3.08	2.44	7.08	5.28	.52	49.95	NP; VP (Pres, Pret, Fut, se, hay, I-neg); Neg.; Wh	1
2;5 – 2;9	4.51	3.48	9.72	7.76	.46	52.99	Imperfect; Wh-Q; Present Subjunctive	1
2;10 – 3;3	5.06	3.81	12.16	9.76	.42	54.18	Imperfect continuous	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.18 (CAR) Summary of Linguistic Competence Measurements in Age Blocks (Spanish)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4							NP (1, 2, 3); VP (1)	1
2;5 – 2;9							NP (2, 3); VP (2, 3); Neg (2, 4); y/n Q (4)	1
2;10 – 3;3	5.14	4.54	8.6	8.2	.39	39.54	VP (5); Neg (5)	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.19 (CAR) Summary of Linguistic Competence Measurements in Age Blocks (English)

PARENT	Spanish		English		Mixing						Class.
	Parent	Child	Parent	Child	Total		Turn		Utterance		
					Parent	Child	Parent	Child	Parent	Child	
M	95	95	2	3	3	2	3	1	0 ^b	1	1
F	92	93	3	5	5	2	4	1	1	1	1
Average	93	94	3	4	4	2	3	1	1	1	1

Key: Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.20 (CAR) Child Code Use in Conversation (by Parent)^a

Age Range	Parent	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
2;0-2;4	M	95	95	3	4	2	1	2	1	0 ⁿ	0	1
	F	90	91	4	7	6	2	5	1	1	1	1
2;5-2;9	M	97	96	1	2	3	2	3	1	0	1	1
	F	93	94	3	4	4	2	3	1	1	1	1
2;10-3;3	M	95	93	1	2	4	5	3	3	1	1	1
	F	—	—	—	—	—	—	—	—	—	—	—

Key: Classification: 0=difference statistically significant; 1=statistically not significant

— = insufficient data

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.21 (CAR) Child Code Use in Conversation (in Age Blocks)^a

PARENT	Context	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	free c. story	97	96	1	2	2	2	2	1	0 ⁿ	1	1
		89	91	5	7	6	2	5	2	1	0	1
F	free c. story	95	95	2	3	3	2	2	1	1	1	1
		84	87	8	11	8	2	7	1	1	1	1
Average	free c. story	96	96	1	2	3	2	2	1	1	0	1
		86	89	7	9	7	2	7	2	0	1	1

Key: Context: free c.=free conversation

story= story reading

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.22 (CAR) Child Code Use in Conversation (by Context)^a

PARENT	Topic	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	n/Sp	97	97	1	1	2	2	2	1	0 ^b	1	1
	Eng	78	80	7	12	15	8	12	5	3	3	1
F	n/Sp	96	96	2	2	2	2	2	1	0	1	1
	Eng	66	72	15	23	19	5	16	3	3	2	1
Average	n/Sp	97	97	1	1	2	2	2	1	0	1	1
	Eng	72	76	11	17	17	7	14	4	3	3	1

Key: Topic: n/Sp=culturally neutral / minority culture

Eng=related to community culture

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.23 (CAR) Child Code Use in Conversation (by Topic)^a

PARENT	Turn	Utterance	Total Mixing	Classification
M	1.1	0.9	2	1
F	0.9	1.1	2	1
Average	1	1	2	1

Key: Classification: 0=not comparable to other normally developing bilinguals

1= comparable to other normally developing bilinguals ($\pm 5\%$)

^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 6.24 (CAR) Mixing of Child Codes in Conversation^a

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (Spanish)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	1
			F	1
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	1
		Amount of Time Under Parental Supervision	M	1
			F	1
		Language Exposure Outside the Home (Spanish)		0
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (Spanish)	M	95%
			F	92%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		1
		Lexical Diversity (TTR; VOCD)		1
		Morphosyntactic Development (ling. milestones)		1
	Language Use	Language of Response to Input Language in Conversation (Spanish)	M	95%
			F	93%
		Mixing of Child Codes in Conversation (Sp. to Eng.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.25 (CAR) Summary of Classifications of Variables (Spanish)

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (English)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	1
			F	1
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	1
		Amount of Time Under Parental Supervision	M	1
			F	1
		Language Exposure Outside the Home (English)		
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (English)	M	2%
			F	3%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (English)	Grammatical Complexity (MLUm/w; MLUmax)		1
		Lexical Diversity (TTR; VOCD)		1
		Morphosyntactic Development (ling. milestones)		1
	Language Use	Language of Response to Input Language in Conversation (English)	M	3%
			F	5%
		Mixing of Child Codes in Conversation (Eng. to Sp.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (English): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (English): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.26 (CAR) Summary of Classification of Variables (English)

6.1.2 Alberto

INDEPENDENT VARIABLES

Preconditions

Parental background

Parental background classifications (Class.) are listed for statistical computation as binary measures, with Classifications indicating proficiency between 1 and 3 listed as 0, while Classification between 3.5 and 5 is assigned a value of 1.

PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average Level	Class.
M	E	5	5	5	5	1
	S	4	4	4	4	1
F	E	5	5	5	5	1
	S	3	3	3	3	0

Key: Parent: M=Mother; F=Father
Language: E=English; S=Spanish
Level: 5=naive; 4=superior; 3=advanced; 2=intermediate; 1=novice; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.1 (ALB) Parental Linguistic Competence in each Language

PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
M	4	5	4	4.5	1
F	4	3	2	3	0

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.2 (ALB) Parental Attitudes to Child Bilingualism

Language exposure

PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
M	0	1	0	0	0
F	0	0	0	0	

Key: 0=English; 1=Spanish

^a Language exposure patterns are listed for statistical computation as binary measures. English is listed with the classification 0, while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 6.3 (ALB) Language Exposure Patterns in the Home ^a

PARENT	Weekdays ^a	Weekends ^a	Week Average ^a	% of Weekly Time	Class.
M	6	10	7	70	1
F	3	10	5	50	0

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 6.4 (ALB) Time Under Parental Supervision

LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
E	10	15	50	0
S	10	15	50	0
Total	20	30		

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 6.5 (ALB) Language Exposure Outside the Home

Conversational data

Language exposure

PARENT	Spanish	English	Mixing		
			Total	Turn	Utterance
M	65	25	10	9	1
F	38	54	8	6	2
Average	51	40	9	8	1

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 6.6 (ALB) Parental Language Use in Conversation (by Parent) ^a

PARENT	Context	Spanish	English	Mixing		
				Total	Turn	Utterance
M	free c.	75	15	10	10	0 ^b
	story	34	56	10	9	1
F	free c.	32	61	7	6	1
	story	64	25	11	8	3
Average	free c.	50	41	9	8	1
	story	49	41	10	8	2

Key: Context: free c.=free conversation
story=story reading

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.7 (ALB) Parental Language Use in Conversation (by Context) ^a

PARENT	Topic	Spanish	English	Mixing		
				Total	Turn	Utterance
M	n/Sp	68	23	9	8	1
	Eng	43	40	17	16	1
F	n/Sp	40	53	7	6	1
	Eng	13	82	5	5	0 ^b
Average	n/Sp	51	41	8	7	1
	Eng	25	65	10	9	1

Key: Topic: n/Sp=culturally neutral / minority culture
Eng=related to community culture

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.8 (ALB) Parental Language Use in Conversation (by Topic)^a

PARENT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
M	5	5	10	47	33
F	1	6	17	57	19
Average	3	5	9	52	26

Key: ^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9a (ALB) Parental Response to Child's Mixing (by Parent)^a

PARENT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
M	20	80	0
F	24	76	0
Average	22	78	0

Key: Trend: 0=acceptance; 1=correction

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9b (ALB) Parental Response to Child's Mixing (by Trend)^a

DEPENDENT VARIABLES

Conversational data

Linguistic competence

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	1;8	1.72*	1.52*	2.8	2.0		1
2	2;0	2.00*	1.60*	3.4	2.2		1
3	2;1	2.20	1.96	4.6	4.0		1
4	2;2	2.06	1.92	5.0	4.8		1
5	2;3	3.43*	2.53*	5.8	4.4		1
6	2;4	2.82	2.22	6.2	4.6		1
7	2;6	3.26*	2.73*	5.6	4.2		1
8	2;7					No data with the Mother	
9	2;8	2.40*	1.95*	4.8	3.8		0
10	2;10	2.13**	1.66**	3.2	2.4		0
11	3;0						

Key: **Classification:** 0=not comparable to monolingual data; 1=comparable to monolingual data

* Based on less than 50 utterances (20 and up)

** Based on less than 20 utterances (15 and up)

Table 6.10 (ALB) Grammatical Complexity in MLU classifications (Spanish)

Recording Session Group	Age	MLU		MLUmax		Class.
		morphemes	words	morphemes	words	
1	1;8	2.62	2.56	6.0	6.0	1
2	2;0	2.40*	2.33*	4.4	4.0	1
3	2;1	2.90	2.74	7.2	6.4	1
4	2;2	3.52	3.26	7.4	7.0	1
5	2;3	3.68	3.44	6.2	6.0	1
6	2;4	3.52	3.34	7.6	7.2	1
7	2;6	4.06	3.80	9.0	8.6	1
8	2;7	4.84	4.58	11.6	11.4	1
9	2;8	3.64**	3.41**	5.6	5.2	0
10	2;10	4.56	4.38	8.6	8.0	1
11	3;0	4.06	3.84	7.4	6.6	1

Key: **Classification:** 0=not comparable to monolingual data; 1=comparable to monolingual data

* Based on less than 50 utterances (20 and up)

** Based on less than 20 utterances (15 and up)

Table 6.11 (ALB) Grammatical Complexity in MLU classifications (English)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Class.
1	1;8	—	—	—	
2	2;0	—	—	—	
3	2;1	59/95	.62	57.26	1
4	2;2	52/96	.54	39.16	1
5	2;3	41/74*	.55*	22.96*	0
6	2;4	61/108	.56	40.92	1
7	2;6	41/63*	.65*	38.85*	0
8	2;7				
9	2;8	—	—	—	
10	2;10				
11	3;0				

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 — = insufficient tokens for random sampling
 * Based on less than 50 utterances (20 and up)

Table 6.12 (ALB) Lexical Variety in TTR & VOCD classifications (Spanish)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Class.
1	1;8	62/125	.49	37.38	1
2	2;0	43/70*	.61*	39.12*	1
3	2;1	69/135	.51	44.35	1
4	2;2	75/162	.46	33.24	1
5	2;3	88/171	.47	41.69	1
6	2;4	62/167	.37	25.16	1
7	2;6	80/187	.42	39.53	1
8	2;7	88/224	.39	38.46	1
9	2;8	40/55**	.72**	50.68**	0
10	2;10	93/213	.43	43.83	1
11	3;0	81/190	.42	34.78	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 * Based on less than 50 utterances (20 and up)
 ** Based on less than 20 utterances (15 and up)

Table 6.13 (ALB) Lexical Variety in TTR & VOCD classifications (English)

Age Range ^a			2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0	Om
S T R U C T U R E	Noun Phrase	N (plural)	X		o											1
		Det + N (pl., fem.)		X						o						1
		(Det) + N + Adj		o			X									1
	Verb Phrase	Present ind. hab. (sg/pl)	X ^o	o												1
		Present ind. continuous			o		□									1
		Pres. Perfect		(X) o	□											1
		Preterit			o□		(X)									1
		Imperfect				o□										0
		Imp. cont.												o		0
		Periphrastic future	◇		o		□									0
		Reflexive <i>se</i>				o										0
		Impersonal <i>hay</i>	o													0
		Imperative Negative		o												0
		Present Subjunctive							o□							0
	Nega- tion	<i>no</i> + V	o	X												1
		<i>no</i> + Adj.	X [*]													1
		Subj. + <i>no</i>	o		X											1
		<i>no</i> + V + Obj.			o	X										1
		Subj. + <i>no</i> + V + Obj.					(X)		*							1
	Wh- Ques.	Wh + V		o												0
		Wh + V + Obj.							o							0

Key: ^a Age in bold corresponds to available data

Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

ind.=indicative

hab.=habitual

X = Alberto

(X) = appears only once in the data

o = Rafael (Hernández Pina 1990)

□ = María (Mueller Gathercole, Sebastián and Soto 1999)

◇ = María (Fernández 1994)

* = Peru (Meisel 1994b)

Table 6.14 (ALB) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Ling. Stage ¹		1	2	3	4	5	Class.
Age Range		1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5	
S T R U C T U R E	Noun Phrase	(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4	1
	Age ^b	1;8	1;8	2;1	2;4		
	Verb Phrase	Lone verb	Marked v. '-ing' w/out <i>be</i> or catenative	Pres. Aux <i>can, will, be</i>	Main V and Aux in Past. Past modals	Past <i>be have</i> + -en Aux + NP	1
	Age	1;8	1;8 ^c	2;0 ^c /2;2 ^d	2;0 ^c /2;4 ^d	2;6 ^c	
	Negation	<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be, can, will, do, does</i> . Past <i>did</i>	Past tense and modals Cat + NP <i>be</i> + -ing	1
	Age	1;8	2;1	—	2;2 ^c /2;4 ^d	—	
	Yes/No Ques.	Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be, can, will, do</i>		1
	Age	1;8	1;8	1;8	2;2		
	Wh-Ques.	<i>what</i> + (<i>this/that</i>) <i>what</i> + (NP) + <i>do</i> + (-ing) <i>where</i> + (NP) + <i>go</i> + (-ing)	<i>what</i> + (N) + V <i>where</i> + (N) + V	Aux without inversion. <i>Why, who, how</i>	<i>Do...?</i> Aux inverted. <i>Be, can, will, do, When...?</i>		1
	Age	2;1	2;2	2;2 ^c /2;4 ^d	2;3 ^c /2;4 ^d		

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

— = no evidence found in the data

^a Linguistic stages according to Brown's labels (1973)

^b Age in which the form appears and/or becomes regularized

^c Form appears only once in the data

^d Form becomes regularized

Table 6.15 (ALB) Morphosyntactic Development in English (Based on Miller 1981)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOC D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	1;8	1.72*	1.52*	2.8	2.0	—	—	NP	1
2	2;0	2.00*	1.60*	3.4	2.2	—	—	NP; Pres. i. hab; Neg	1
3	2;1	2.20	1.96	4.6	4.0	.62	57.26	NP; (P. Perf.); Neg.	1
4	2;2	2.06	1.92	5.0	4.8	.54	39.16	Neg.	1
5	2;3	3.43*	2.53*	5.8	4.4	.55*	22.96*	Neg.	0
6	2;4	2.82	2.22	6.2	4.6	.56	40.92	NP; (Pret.); (Neg.)	0
7	2;6	3.26*	2.73*	5.6	4.2	.65*	38.85*		0
8	2;7								
9	2;8	2.40*	1.95*	4.8	3.8	—	—		0
10	2;10	2.13**	1.66**	3.2	2.4				0
11	3;0								0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

— = insufficient tokens for random sampling

* Based on less than 50 utterances (20 and up)

** Based on less than 20 utterances (15 and up)

Table 6.16 (ALB) Summary of Linguistic Competence Measurements (Spanish)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOC D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	1;8	2.62	2.56	6.0	6.0	.49	37.38	NP (1,2)*; VP (1,2); Neg (1); y/n (1,2,3)	1
2	2;0	2.40*	2.33*	4.4	4.0	.61*	39.12*		1
3	2;1	2.90	2.74	7.2	6.4	.51	44.35	NP (3); Neg (2); Wh-Q (1)	1
4	2;2	3.52	3.26	7.4	7.0	.46	33.24	VP (3); y/n (4); Wh-Q (2)	1
5	2;3	3.68	3.44	6.2	6.0	.47	41.69		1
6	2;4	3.52	3.34	7.6	7.2	.37	25.16	NP (4); VP (4); Neg (4); Wh-Q (4)	1
7	2;6	4.06	3.80	9.0	8.6	.42	39.53	VP (5)	1
8	2;7	4.84	4.58	11.6	11.4	.39	38.46		1
9	2;8	3.64**	3.41**	5.6	5.2	.72**	50.68**		0
10	2;10	4.56	4.38	8.6	8.0	.43	43.83		1
11	3;0	4.06	3.84	7.4	6.6	.42	34.78		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

^a Corresponding linguistic stage

* Based on less than 50 utterances (20 and up)

** Based on less than 20 utterances (15 and up)

Table 6.17 (ALB) Summary of Linguistic Competence Measurements (English)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	2.50	2.04	5.0	4.0	.56	40.07	NP; VP (Pres hab., P. perf.; Preterit); Neg.	1
2;5 – 2;9	2.83	2.34	5.2	4.0	.65	38.85		0
2;10 – 3;3	2.13	1.66	3.2	2.4	—	—		0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
— = insufficient tokens for random sampling

Table 6.18 (ALB) Summary of Linguistic Competence Measurements in Age Blocks (Spanish)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	3.20	3.02	6.5	6.1	.48	44.18	NP (1,2,3,4); VP (1,2,3,4) Neg (1,2,4); y/n (1,2,3,4); WhQ (1,2,3,4)	1
2;5 – 2;9	4.18	3.93	8.7	8.4	.51	42.89	VP (5)	1
2;10 – 3;3	4.31	4.11	8.0	7.3	.42	39.30		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.19 (ALB) Summary of Linguistic Competence Measurements in Age Blocks (English)

PARENT	Spanish		English		Mixing						Class.
	Parent	Child	Parent	Child	Total		Turn		Utterance		
					Parent	Child	Parent	Child	Parent	Child	
M	65	31	25	65	10	4	9	2	1	2	0
F	38	12	54	83	8	5	6	2	2	3	0
Average	51	22	40	74	9	4	8	2	1	2	0

Key: Classification: 0=difference statistically significant; 1=statistically not significant
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 6.20 (ALB) Child Code Use in Conversation (by Parent)^a

Age Range	Parent	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
2;0–2;4	M	69	31	20	64	11	5	10	3	1	2	0
	F	44	18	48	80	8	3	7	1	1	2	0
2;5–2;9	M	0 ^b	0	99	100	1	0	3	0	1	0	1
	F	36	13	58	79	6	8	4	3	2	5	0
2;10–3;3	M	—	—	—	—	—	—	—	—	—	—	—
	F	16	4	80	93	4	3	4	2	0	1	0

Key: Classification: 0=difference statistically significant; 1=statistically not significant
 — = insufficient data
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%

Table 6.21 (ALB) Child Code Use in Conversation (in Age Blocks)^a

PARENT	Context	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	free c. story	75	36	15	59	10	5	10	3	0 ^b	2	0
		34	18	56	81	10	1	9	0	1	1	0
F	free c. story	32	11	61	85	7	4	6	2	1	2	0
		64	22	25	72	11	6	8	1	3	5	0
Average	free c. story	50	23	41	72	9	5	8	3	1	2	0
		49	20	41	76	10	4	8	1	2	3	0

Key: Context: free c.=free conversation
 story=story reading
Classification: 0=difference statistically significant; 1=statistically not significant
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%

Table 6.22 (ALB) Child Code Use in Conversation (by Context)^a

PARENT	Topic	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	n/Sp	68	32	23	63	9	5	8	3	1	2	0
	Eng	43	25	40	73	17	2	16	1	1	1	0
F	n/Sp	40	14	53	81	7	5	6	2	1	3	0
	Eng	13	3	82	94	5	3	5	1	0 ^b	2	0
Average	n/Sp	51	21	41	74	8	5	7	2	1	3	0
	Eng	25	12	65	86	10	2	9	1	1	1	0

Key: Topic: n/Sp=culturally neutral / minority culture

Eng=related to community culture

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.23 (ALB) Child Code Use in Conversation (by Topic)^a

PARENT	Turn	Utterance	Total Mixing	Class.
M	34.3	2.1	36.4	0
F	22.6	3	25.6	0
Average	28.4	2.5	31	0

Key: Classification: 0=not comparable to other normally developing bilinguals

1= comparable to other normally developing bilinguals ($\pm 5\%$)

^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 6.24 (ALB) Mixing of Child Codes in Conversation^a

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (Spanish)	M	1
			F	0
		Parental Attitudes to Child Bilingualism	M	1
			F	0
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	0
		Amount of Time Under Parental Supervision	M	1
			F	0
		Language Exposure Outside the Home (Spanish)		0
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (Spanish)	M	65%
			F	38%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		0
		Lexical Diversity (TTR; VOCD)		0
		Morphosyntactic Development (ling. milestones)		0
	Language Use	Language of Response to Input Language in Conversation (Spanish)	M	31%
			F	12%
		Mixing of Child Codes in Conversation (Sp. to Eng.)	M	0
			F	0

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.25 (ALB) Summary of Classification of Variables (Spanish)

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (English)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	1
			F	0
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	0
		Amount of Time Under Parental Supervision	M	1
			F	0
		Language Exposure Outside the Home (English)		
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (English)	M	25%
			F	54%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		1
		Lexical Diversity (TTR; VOCD)		1
		Morphosyntactic Development (ling. milestones)		1
	Language Use	Language of Response to Input Language in Conversation (English)	M	65%
			F	83%
		Mixing of Child Codes in Conversation (Eng. to Sp.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (English): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (English): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.26 (ALB) Summary of Classification of Variables (English)

6.1.3 John

INDEPENDENT VARIABLES

Preconditions

Parental background

Parental background classifications (Class.) are listed for statistical computation as binary measures, with Classifications indicating proficiency between 1 and 3 listed as 0, while Classification between 3.5 and 5 is assigned a value of 1.

PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average Level	Class.
M	E	5	5	5	5	1
	S	2	2	2	2	0
F	E	4	3	4	3.5	1
	S	5	5	5	5	1

Key: Parent: M=Mother; F=Father
Language: E=English; S=Spanish
Level: 5=ative; 4=superior; 3=advanced; 2=intermediate; 1=novice; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.1 (JOH) Parental Linguistic Competence in each Language

PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
M	3	4	2	3	0
F	4	5	4	4.5	1

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.2 (JOH) Parental Attitudes to Child Bilingualism

Language exposure

PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
M	0	0	0	0	0
F	1	1	0	0	

Key: 0=English; 1=Spanish

^a Language exposure patterns are listed for statistical computation as binary measures. English is listed with the classification 0, while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 6.3 (JOH) Language Exposure Patterns in the Home ^a

PARENT	Weekdays ^a	Weekends ^a	Week Average ^a	% of Weekly Time	Class.
M	5	10	6	64	1
F	2	10	4	43	0

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 6.4 (JOH) Time Under Parental Supervision

LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
E	25	36	100	1
S	0	0	0	0
Total	25	36		

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 6.5 (JOH) Language Exposure Outside the Home

Conversational data

Language exposure

PARENT	Spanish	English	Mixing		
			Total	Turn	Utterance
M	7	81	12	7	5
F	95	3	2	1	1
Average	51	42	7	4	3

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 6.6 (JOH) Parental Language Use in Conversation (by Parent) ^a

PARENT	Context	Spanish	English	Mixing		
				Total	Turn	Utterance
M	free c. story	7	87	6	4	2
		8	74	18	10	8
F	free c. story	95	3	2	1	1
		96	0 ^b	4	2	2
Average	free c. story	51	45	4	3	1
		52	37	11	6	5

Key: Context: free c.=free conversation; story=story reading

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.7 (JOH) Parental Language Use in Conversation (by Context) ^a

PARENT	Topic	Spanish	English	Mixing		
				Total	Turn	Utterance
M	n/Sp	8	81	11	6	5
	Eng	3	76	21	18	1
F	n/Sp	95	2	3	1	2
	Eng	89	7	4	4	0 ^b
Average	n/Sp	51	42	7	3	4
	Eng	46	42	12	11	1

Key: Topic: n/Sp=culturally neutral / minority culture; Eng=related to community culture

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.8 (JOH) Parental Language Use in Conversation (by Topic) ^a

PARENT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
M	2	2	2	49	45
F	7	9	17	62	5
Average	5	6	9	55	25

Key: ^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9a (JOH) Parental Response to Child's Mixing (by Parent)^a

PARENT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
M	6	94	0
F	33	67	0
Average	20	80	0

Key: Trend: 0=acceptance; 1=correction

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9b (JOH) Parental Response to Child's Mixing (by Trend)^a

DEPENDENT VARIABLES

Conversational data

Linguistic competence

Recording Session Group	Age	MLU		MLUmax		Class.
		morphemes	words	morphemes	words	
1	2;0	2.00*	1.80*	3.0	3.0	1
2	2;1	1.60*	1.52*	3.2	3.0	0
3	2;2	1.82	1.74	4.2	3.8	0
4	2;3	1.96*	1.83*	3.2	3.6	0
5	2;5	3.22	2.78	5.8	4.6	1
6	2;11					
7	3;3	2.76	2.38	6.4	5.0	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

^a Based on less than 50 utterances (20 and up)

Table 6.10 (JOH) Grammatical Complexity in MLU scores (Spanish)

Recording Session Group	Age	MLU		MLUmax		Class.
		morphemes	words	morphemes	words	
1	2;0	2.56	2.38	5.4	5.0	1
2	2;1	2.88	2.48	6.6	4.6	1
3	2;2	3.00	2.94	5.6	5.6	1
4	2;3	3.28	3.06	6.8	6.2	1
5	2;5	4.81	4.38	10.6	9.2	1
6	2;11	5.16	4.76	10.4	10.0	1
7	3;3	5.38	5.32	12.8	12.2	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.11 (JOH) Grammatical Complexity in MLU scores (English)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Class.
1	2;0	—	—	—	
2	2;1	—	—	—	
3	2;2	40/84	.47	25.02	0
4	2;3	35/55*	.63*	32.26*	0
5	2;5	53/138	.38	24.94	0
6	2;11				
7	3;3	62/119	.52	50.75	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
— = insufficient data for random sampling

* Based on less than 50 utterances (20 and up)

Table 6.12 (JOH) Lexical Variety in TTR & VOCD scores (Spanish)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Class.
1	2;0	65/118	.55	.51.69	1
2	2;1	44/120	.36	15.29	1
3	2;2	56/144	.38	24.53	1
4	2;3	63/151	.41	33.66	1
5	2;5	74/213	.34	26.25	1
6	2;11	102/234	.43	59.89	1
7	3;3	89/260	.34	37.72	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.13 (JOH) Lexical Variety in TTR & VOCD scores (English)

Age Range ^a			2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0 ^b	Obs.
S T R U C T U R E	Noun Phrase	N (plural)	X		o											1
		Det + N (pl., fem.)								o					X	0
		(Det) + N + Adj		o											X	0
	Verb Phrase	Present ind. hab. (sg/pl)	o	X o												1
		Present ind. continuous			o		□									0
		Pres. Perfect		o	□											0
		Preterit			o□	(X)		[X]								1
		Imperfect				o□										0
		Imp. cont.												o		0
		Periphrastic future	o		o		□	[X]								1
		Reflexive <i>se</i>				(X) o		X								1
		Impersonal <i>hay</i>	o					X								0
		Imperative Negative		(X) o												1
		Present Subjunctive							o□							0
	Negation	<i>no</i> + V	o	X												1
		<i>no</i> + Adj.	*		X											1
		Subj. + <i>no</i>	o			(X)										1
		<i>no</i> + V + Obj.			o			X								1
		Subj. + <i>no</i> + V + Obj.							*					X		1
	Wh- Ques.	Wh + V		o										X		0
		Wh + V + Obj.							o					X		1

Key: ^a Age in bold corresponds to available data

^b Structures appear after 3;0

Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

ind.=indicative

hab.=habitual

X = John

(X) = appears only once in the data

[X] = appears repeatedly but only in one verb form

o = Rafael (Hernández Pina 1990)

□ = María (Mueller Gathercole, Sebastián and Soto 1999)

◊ = María (Fernández 1994)

* = Peru (Meisel 1994b)

Table 6.14 (JOH) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Ling. Stage ^a		1	2	3	4	5	Class.
Age Range		1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5	
S T R U C T U R E	Noun Phrase	(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4	1
	Age ^b	2;0	2;0	2;0	2;2		
	Verb Phrase	Lone verb	Marked v. '-ing' w/out <i>be</i> or catenative	Pres. Aux <i>can</i> , <i>will</i> , <i>be</i>	Main V and Aux in Past. Past modals	Past <i>be</i> have + -en Aux + NP	1
	Age	2;0	2;0	2;0 ^c /2;3 ^d	2;5 ^c /2;11 ^d	3;3	
	Negation	<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be</i> , <i>can</i> , <i>will</i> , <i>do</i> , <i>does</i> . Past <i>did</i>	Past tense and modals Cat + NP <i>be</i> + -ing	1
	Age	2;0	2;1	—	2;11	—	
	Yes/No Ques.	Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be</i> , <i>can</i> , <i>will</i> , <i>do</i>		1
	Age	2;0	2;0	2;0	2;3 ^c /2;5 ^d		
	Wh-Ques.	<i>what</i> + (<i>this/that</i>) <i>what</i> + (NP) + <i>do</i> + (-ing) <i>where</i> + (NP) + <i>go</i> + (-ing)	<i>what</i> + (N) + V <i>where</i> + (N) + V	Aux without inversion. <i>Why</i> , <i>who</i> , <i>how</i>	<i>Do...?</i> Aux inverted. <i>Be</i> , <i>can</i> , <i>will</i> , <i>do</i> . <i>When...?</i>		1
	Age	2;0	2;0 ^c /2;2 ^d	2;0 ^c /2;1 ^d	2;3 ^c /3;3 ^d		

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

— = no evidence found in the data

^a Linguistic stages according to Brown's labels (1973)

^b Age in which the form appears and/or becomes regularized

^c Form appears only once in the data

^d Form becomes regularized

Table 6.15 (JOH) Morphosyntactic Development in English (Based on Miller 1981)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;0	2.00*	1.80*	3.0	3.0	—	—	NP: N (plural);	1
2	2;1	1.60*	.52*	3.2	3.0	—	—	Pres. ind. hab.; Imp.neg.; Neg. (V)	0
3	2;2	1.82	1.74	4.2	3.8	.47	25.02	Neg. (<i>no</i> + Adj.)	0
4	2;3	1.96*	1.83*	3.2	3.6	.63*	32.26*	Neg. (Subj. + <i>no</i>)	0
5	2;5	3.22	2.78	5.8	4.6	.38	24.94	Preterit; Per. Fut; <i>hay; se</i> ; Neg. (<i>no</i> +V.+Obj.)	0
6	2;11							Neg (Subj + <i>no</i> + V. + Obj.); Wh-Q.	0
7	3;3	2.76	2.38	6.4	5.0	.52	50.75	NP (Det; Adj.)	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on a number of utterances less than 50 (20 and up)
— = insufficient data for random sampling

Table 6.16 (JOH) Summary of Linguistic Competence Measurements (Spanish)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;0	2.56	2.38	5.4	5.0	.55	51.69	NP (1,2,3) ^a ; VP (1,2); Neg (1); y/n (1,2,3); Wh-Q. (1)	1
2	2;1	2.88	2.48	6.6	4.6	.36	15.29	Neg (2) Wh-Q. (3)	1
3	2;2	3.00	2.94	5.6	5.6	.38	24.53	NP (4) Wh-Q. (2)	1
4	2;3	3.28	3.06	6.8	6.2	.41	33.66	VP (3)	1
5	2;5	4.81	4.38	10.6	9.2	.34	26.25	y/n (4)	1
6	2;11	5.16	4.76	10.4	10.0	.43	59.89	VP (4) Neg (4)	1
7	3;3	5.38	5.32	12.8	12.2	.34	37.72	VP (5); Wh-Q (4)	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
^a Corresponding linguistic stage

Table 6.17 (JOH) Summary of Linguistic Competence Measurements (English)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	1.84	1.72	3.4	3.3	.55	28.64	NP; VP (Pres. hab.; Imp. neg); Neg. (V, Adj, Subj)	0
2;5 – 2;9	3.22	2.78	5.8	4.6	.38	24.94	Preterit; Per. Fut; <i>hay</i> ; <i>se</i> ; Neg. (no+V.+Obj.)	0
2;10 – 3;3	2.76	2.38	6.4	5.0	.52	50.75	NP (Det; Adj.); Neg (S+V+O); Wh-Q.	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.18 (JOH) Summary of Linguistic Competence Measurements in Age Blocks (Spanish)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	2.93	2.71	6.1	5.3	.42	31.29	NP (1,2,3,4); VP (1, 2,3); Neg (1,2); y/n (1,2,3); Wh-Q. (1,2,3)	1
2;5 – 2;9	4.81	4.38	10.6	9.2	.34	26.25	y/n (4)	1
2;10 – 3;3	5.27	5.04	11.6	11.1	.38	48.80	VP (4, 5); Neg (4); Wh-Q (4)	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.19 (JOH) Summary of Linguistic Competence Measurements in Age Blocks (English)

PARENT	Spanish		English		Mixing						Class.
	Parent	Child	Parent	Child	Total		Turn		Utterance		
					Parent	Child	Parent	Child	Parent	Child	
M	7	5	81	87	12	8	7	3	5	5	1
F	95	30	3	55	2	15	1	6	1	9	0
Average	51	17	42	71	7	12	4	5	3	7	0

Key: Classification: 0=difference statistically significant; 1=statistically not significant
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 6.20 (JOH) Child Code Use in Conversation (by Parent)^a

Age Range	Parent	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
2;0–2;4	M	7	5	80	86	13	9	8	3	5	6	1
	F	94	15	3	69	4	16	2	6	2	10	0
2;5–2;9 ^b	M	50	14	50	72	0 ^c	14	0	7	0	7	0
	F	99	32	0	46	1	22	0	13	1	9	0
2;10–3;3	M	0	0	100	100	0	0	0	0	0	0	1
	F	95	49	4	39	1	12	0	5	1	7	0

Key: Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b based on a low amount of data

^c less than 1%

Table 6.21 (JOH) Child Code Use in Conversation (in Age Blocks) ^a

PARENT	Context	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	free c. story	7	5	87	91	6	4	4	2	2	2	1
		8	5	74	83	18	12	10	3	8	9	1
F	free c. story	95	32	3	51	2	17	1	8	1	9	0
		96	24	0 ^b	65	4	11	2	2	2	9	0
Average	free c. story	51	18	45	71	4	11	3	5	1	6	0
		52	14	37	74	11	12	6	3	5	9	0

Key: Context: free c.=free conversation
story=story reading

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.22 (JOH) Child Code Use in Conversation (by Context) ^a

PARENT	Topic	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	n/Sp	8	5	81	86	11	9	6	3	5	6	1
	Eng	3	3	76	94	21	3	18	0 ^b	3	3	1
F	n/Sp	95	20	2	62	3	18	1	8	2	10	0
	Eng	89	0	7	86	4	14	4	4	0	10	0
Average	n/Sp	51	12	42	74	7	14	3	6	4	8	0
	Eng	46	1	42	90	12	9	11	2	1	7	0

Key: Topic: n/Sp=culturally neutral / minority culture

Eng=related to community culture

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.23 (JOH) Child Code Use in Conversation (by Topic)^a

PARENT	Turn	Utterance	Total Mixing	Class.
M	2.5	5.5	8	1
F	65	9	74	0
Average	33.7	7.2	40.9	0

Key: Classification: 0=not comparable to other normally developing bilinguals

1= comparable to other normally developing bilinguals ($\pm 5\%$)

^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 6.24 (JOH) Mixing of Child Codes in Conversation^a

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (Spanish)	M	0
			F	1
		Parental Attitudes to Child Bilingualism	M	0
			F	1
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	0
			F	1
		Amount of Time Under Parental Supervision	M	1
			F	0
		Language Exposure Outside the Home (Spanish)		0
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (Spanish)	M	7%
			F	95%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		0
		Lexical Diversity (TTR; VOCD)		0
		Morphosyntactic Development (ling. milestones)		0
	Language Use	Language of Response to Input Language in Conversation (Spanish)	M	5%
			F	30%
		Mixing of Child Codes in Conversation (Sp. to Eng.)	M	1
			F	0

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.25 (JOH) Summary of Classification of Variables (Spanish)

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (English)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	0
			F	1
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	0
			F	1
		Amount of Time Under Parental Supervision	M	1
			F	0
		Language Exposure Outside the Home (English)		
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (English)	M	81%
			F	3%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (English)	Grammatical Complexity (MLUm/w; MLUmax)		0
		Lexical Diversity (TTR; VOCD)		0
		Morphosyntactic Development (ling. milestones)		0
	Language Use	Language of Response to Input Language in Conversation (English)	M	87%
			F	55%
		Mixing of Child Codes in Conversation (Eng. to Sp.)	M	1
			F	0

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.
Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.
Language Exposure Patterns in the Home: 0=English; 1=Spanish
Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%
Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%
Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation
Parental Response to Child's Mixing: 0=acceptance; 1=correction
Child's Linguistic Competence (English): 0=not comparable to monolingual data; 1=comparable
Language of Response to Input Language in Conversation (English): absolute percentage
Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.26 (JOH) Summary of Classification of Variables (English)

6.1.4 Tina

INDEPENDENT VARIABLES

Preconditions

Parental background

Parental background classifications (Class.) are listed for statistical computation as binary measures, with classifications indicating proficiency between 1 and 3 listed as 0, while Classification between 3.5 and 5 is assigned a value of 1.

PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average Level	Class.
M	E	4	4	4	4	1
	S	5	5	5	5	1
F	E	5	5	5	5	1
	S	4	4	4	4	1

Key: Parent: M=Mother; F=Father
Language: E=English; S=Spanish
Level: 5=naive; 4=superior; 3=advanced; 2=intermediate; 1=novice; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.1 (TIN) Parental Linguistic Competence in each Language

PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
M	5	5	5	5	1
F	5	5	4	4.5	1

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.2 (TIN) Parental Attitudes to Child Bilingualism

Language exposure

PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
M	1	1	1	1	1
F	0	1	1	1	

Key: 0=English; 1=Spanish

^a Language exposure patterns are listed for statistical computation as binary measures. English is listed with the classification 0, while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 6.3 (TIN) Language Exposure Patterns in the Home ^a

PARENT	Weekdays ^a	Weekends ^a	Week Average ^a	% of Weekly Time	Class.
M	6	10	7	70	1
F	2	10	4	43	0

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 6.4 (TIN) Time Under Parental Supervision

LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
E	20	30	100	1
S	0	0	0	0
Total	20	30		

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 6.5 (TIN) Language Exposure Outside the Home

Conversational data

Language exposure

PARENT	Spanish	English	Mixing		
			Total	Turn	Utterance
M	94	1	5	4	1
F ^b	90	5	5	4	1
Average	92	3	5	4	1

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b information about the father not obtained through recorded data

Table 6.6 (TIN) Parental Language Use in Conversation (by Parent)^a

PARENT	Context	Spanish	English	Mixing		
				Total	Turn	Utterance
M	free c.	93	2	5	4	1
	story	96	1	3	3	0 ^b
F	free c.	—	—	—	—	—
	story	—	—	—	—	—
Average ^c	free c.	93	2	5	4	1
	story	96	1	3	3	0

Key: free c.=free conversation; story=story reading
 — = information not available or insufficient
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%
^c due to lack of data from the father, only the data from the mother is considered in the average

Table 6.7 (TIN) Parental Language Use in Conversation (by Context)^a

PARENT	Topic	Spanish	English	Mixing		
				Total	Turn	Utterance
M	n/Sp	96	1	4	3	1
	Eng	83	5	12	9	3
F	n/Sp	—	—	—	—	—
	Eng	—	—	—	—	—
Average ^b	n/Sp	96	1	4	3	1
	Eng	83	5	12	9	3

Key: Topic: n/Sp=culturally neutral / minority culture; Eng=related to community culture
 — = information not available or insufficient
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.8 (TIN) Parental Language Use in Conversation (by Topic)^a

PARENT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
M	2	16	15	27	40
F	—	—	—	—	—
Average ^b	2	16	15	27	40

Key: — = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.9a (TIN) Parental Response to Child's Mixing (by Parent)^a

PARENT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
M	33	67	0
F	—	—	—
Average ^b	33	67	0

Key: Trend: 0=acceptance; 1=correction

— = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.9b (TIN) Parental Response to Child's Mixing (by Trend)^a

DEPENDENT VARIABLES

Conversational data

Linguistic competence

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	2;2	2.16	1.76	5.4	4.8		1
2	2;3	3.18	2.62	7.2	6.0		1
3	2;4	3.62	2.84	8.0	7.0	Upon return from Spain	1
4	2;5	3.90	3.06	10.6	8.0		1
5	2;11	5.22	3.78	15.8	11.4		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.10 (TIN) Grammatical Complexity in MLU classifications (Spanish)

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	2;2	1.54	1.36	3.0	2.6		0
2	2;3	2.02*	1.82*	4.8	4.2		1
3	2;4						
4	2;5						
5	2;11	3.23*	3.00*	6.6	6.2	Span. conversation	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.11 (TIN) Grammatical Complexity in MLU classifications (English)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Comments	Class.
1	2;2	51/88	.57	40.11		1
2	2;3	58/131	.44	32.38		1
3	2;4	89/142	.62	70.37	Upon return from Spain	1
4	2;5	78/153	.40	56.03		1
5	2;11	113/189	.59	78.72		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.12 (TIN) Lexical Variety in TTR & VOCD classifications (Spanish)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Comments	Class.
1	2;2	42/68	.61	34.35		0
2	2;3	33/73*	.45*	16.51*		0
3	2;4					
4	2;5					
5	2;11	42/64*	.65*	40.48*	Span. conversation	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.13 (TIN) Lexical Variety in TTR & VOCD classifications (English)

Age Range ^a			2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0	Obs.
S T R U C T U R E	Noun Phrase	N (plural)			X ○											1
		Det + N (pl., fem.)					X			○						1
		(Det) + N + Adj		○		X										1
	Verb Phrase	Present ind. hab. (sg/pl)	◊	○	X											1
		Present ind. continuous			○		X □									1
		Pres. Perfect		○	□			X								1
		Preterit			○□	X										1
		Imperfect				○□		X								1
		Imp. cont.												X ○		1
		Periphrastic future	◊		○		X□									1
		Reflexive <i>se</i>				○		X								1
		Impersonal <i>hay</i>	○				X									1
		Imperative Negative		○				X								1
		Present Subjunctive							○□					X		1
	Nega- tion	<i>no</i> + V	○			X										1
		<i>no</i> + Adj.	*			X										1
		Subj. + <i>no</i>	○			X										1
		<i>no</i> + V + Obj.			○		X									1
		Subj. + <i>no</i> + V + Obj.						X	*							1
	Wh- Ques.	Wh + V		○			X									1
		Wh + V + Obj.					X		○							1

Key: ^a Age in bold corresponds to available data
Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
ind.=indicative
hab.=habitual
X = Tina
○ = Rafael (Hernández Pina 1990)
□ = María (Mueller Gathercole, Sebastián and Soto 1999)
◊ = María (Fernández 1994)
* = Peru (Meisel 1994b)

Table 6.14 (TIN) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Ling. Stage ^a		1	2	3	4	5	Class.
Age Range		1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5	
S T R U C T U R E	Noun Phrase	(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4	1
	Age ^b	2;2	2;5	2;11	2;11		
	Verb Phrase	Lone verb	Marked v. '-ing' w/out be or catenative	Pres. Aux <i>can, will, be</i>	Main V and Aux in Past. Past modals	Past <i>be have</i> + -en Aux + NP	1
	Age	2;2	2;11	2;11	—	—	
	Negation	<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be, can, will, do, does.</i> Past <i>did</i>	Past tense and modals Cat + NP <i>be</i> + -ing	1
	Age	2;2	2;2 ^c	—	—	—	
	Yes/No Ques.	Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be, can, will, do</i>		—
	Age	—	—	—	—		
	Wh-Ques.	<i>what</i> + (<i>this/that</i>) <i>what</i> + (NP) + <i>do</i> + (-ing) <i>where</i> + (NP) + <i>go</i> + (-ing)	<i>what</i> + (N) + V <i>where</i> + (N) + V	Aux without inversion. <i>Why, who, how</i>	<i>Do...?</i> Aux inverted. <i>Be, can, will, do. When...?</i>		—
	Age	—	—	—	—		

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 — = no evidence found in the data

^a Linguistic stages according to Brown's labels (1973)

^b Age in which the form appears and/or becomes regularized

^c Form appears only once in the data

Table 6.15 (TIN) Morphosyntactic Development in English (Based on Miller 1981)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;2	2.16	1.76	5.4	4.8	.57	40.11	NP: N (plural); Pres. ind. hab.	1
2	2;3	3.18	2.62	7.2	6.0	.44	32.38	NP; Preterit; Neg. (V, Adj, Subj.)	1
3	2;4	3.62	2.84	8.0	7.0	.62	70.37	NP; Pres. i. cont.; P. fut.; <i>hay</i> ; Neg.; Wh-Q.	1
4	2;5	3.90	3.06	10.6	8.0	.40	56.03	Pres. perf.; Imperf.; <i>se</i> ; Imp.neg.; Neg.	1
5	2;11	5.22	3.78	15.8	11.4	.59	78.72	Imperfect continuous; Present subjunctive	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.16 (TIN) Summary of Linguistic Competence Measurements (Spanish)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;2	1.54	1.36	3.0	2.6	.61	34.35	NP (1) ² ; VP (1); Neg (1,2)	0
2	2;3	2.02*	1.82*	4.8	4.2	.45*	16.51*		1
3	2;4								
4	2;5							NP (2)	0
5	2;11	3.23*	3.00*	6.6	6.2	.65*	40.48*	NP (3, 4); VP (2, 3)	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

² Corresponding linguistic stage

* Based on less than 50 utterances (20 and up)

Table 6.17 (TIN) Summary of Linguistic Competence Measurements (English)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	2.98	2.40	6.8	5.9	.54	47.62	NP; VP (Pres, Pret, Fut, , hay); Neg.; Wh-Q.	1
2;5 – 2;9	3.90	3.06	10.6	8.0	.40	56.03	Pres. Perf.; Imperfect; se; Imper. neg: Neg.	1
2;10 – 3;3	5.22	3.78	15.8	11.4	.59	78.72	Imperfect continuous: Present subjunctive	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.18 (TIN) Summary of Linguistic Competence Measurements in Age Blocks (Spanish)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	1.78	1.59	3.9	3.4	.53	25.43	NP (1); VP (1); Neg (1, 2)	0
2;5 – 2;9							NP (2)	0
2;10 – 3;3	3.23*	3.00*	6.6	6.2	.65*	40.48*	NP (3, 4); VP (2, 3)	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.19 (TIN) Summary of Linguistic Competence Measurements in Age Blocks (English)

PARENT	Spanish		English		Mixing						Class.
	Parent	Child	Parent	Child	Total		Turn		Utterance		
					Parent	Child	Parent	Child	Parent	Child	
M	94	90	1	7	5	3	4	1	1	2	1
F ^b	90	90	5	5	5	5	4	4	1	1	1
Average	92	90	3	6	5	4	4	3	1	1	1

Key: Classification: 0=difference statistically significant; 1=statistically not significant
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b information about the father not obtained through recorded data

Table 6.20 (TIN) Child Code Use in Conversation (by Parent)^a

Age Range	Parent	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
2;0–2;4	M	92	87	2	8	6	5	5	1	1	4	1
	F ^b	90	90	5	5	5	5	4	4	1	1	1
2;5–2;9	M	98	97	0 ^c	3	2	0	1	0	1	0	1
	F	90	90	5	5	5	5	4	4	1	1	1
2;10–3;3	M	92	85	4	11	4	4	3	3	1	1	1
	F	90	90	5	5	5	5	4	4	1	1	1

Key: Classification: 0=difference statistically significant; 1=statistically not significant
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b information about the father not obtained through recorded data; it does not allow a longitudinal differentiation
^c less than 1%

Table 6.21 (TIN) Child Code Use in Conversation (in Age Blocks)^a

PARENT	Context	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	free c. story	93	90	2	7	5	3	4	1	1	2	1
		96	92	1	5	3	3	3	2	0 ^b	1	1
F ^c	free c. story	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	—	—	—	—	—	—	—	—
Average	free c. story	93	90	2	7	5	3	4	1	1	2	1
		96	92	1	5	3	3	3	2	0	1	1

Key: Context: free c.=free conversation
story=story reading
Classification: 0=difference statistically significant; 1=statistically not significant
— = information not available or insufficient
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%
^c due to lack of data from the father, only the data from the mother is considered in the average

Table 6.22 (TIN) Child Code Use in Conversation (by Context)^a

PARENT	Topic	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	n/Sp	96	93	1	4	4	3	3	1	1	2	1
	Eng	83	74	5	18	12	8	9	3	3	5	1
F ^b	n/Sp	—	—	—	—	—	—	—	—	—	—	—
	Eng	—	—	—	—	—	—	—	—	—	—	—
Average	n/Sp	96	93	1	4	4	3	3	1	1	2	1
	Eng	83	74	5	18	12	8	9	3	3	5	1

Key: Topic: n/Sp=culturally neutral / minority culture

Eng=related to community culture

Classification: 0=difference statistically significant; 1=statistically not significant

— = information not available or insufficient

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.23 (TIN) Child Code Use in Conversation (by Topic)^a

PARENT	Turn	Utterance	Total Mixing	Class.
M	4.6	2.4	7	1
F ^b	4	1	5	1
Average	4.3	1.7	6	1

Key: Classification: 0=not comparable to other normally developing bilinguals

1= comparable to other normally developing bilinguals ($\pm 5\%$)

^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 6.24 (TIN) Mixing of Child Codes in Conversation^a

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (Spanish)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	1
			F	1
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	1
		Amount of Time Under Parental Supervision	M	1
			F	0
		Language Exposure Outside the Home (Spanish)		
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (Spanish)	M	94%
			F	90%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		1
		Lexical Diversity (TTR; VOCD)		1
		Morphosyntactic Development (ling. milestones)		1
	Language Use	Language of Response to Input Language in Conversation (Spanish)	M	90%
			F	90%
		Mixing of Child Codes in Conversation (Sp. to Eng.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitude to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.25 (TIN) Summary of Classification of Variables (Spanish)

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (English)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	1
			F	1
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	1
		Amount of Time Under Parental Supervision	M	1
			F	0
		Language Exposure Outside the Home (English)		
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (English)	M	1%
			F	5%
		Parental Response to Child's Mixing	M	0
			F	0
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (English)	Grammatical Complexity (MLUm/w; MLUmax)		0
		Lexical Diversity (TTR; VOCD)		0
		Morphosyntactic Development (ling. milestones)		0
	Language Use	Language of Response to Input Language in Conversation (English)	M	7%
			F	5%
		Mixing of Child Codes in Conversation (Eng. to Sp.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (English): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (English): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 6.26 (TIN) Summary of Classification of Variables (English)

6.1.5 Sheila

INDEPENDENT VARIABLES

Preconditions

Parental background

Parental background classifications (Class.) are listed for statistical computation as binary measures, with Classifications indicating proficiency between 1 and 3 listed as 0, while Classification between 3.5 and 5 is assigned a value of 1.

PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average Level	Class.
M	E	5	5	5	5	1
	S	4	5	4	4.5	1
F	E	5	5	5	5	1
	S	1	1	1	1	0

Key: Parent: M=Mother; F=Father
Language: E=English; S=Spanish
Level: 5=naive; 4=superior; 3=advanced; 2=intermediate; 1=novice; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.1 (SHE) Parental Linguistic Competence in each Language

PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
M	4	5	5	4.5	1
F	2	1	1	1.5	0

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.2 (SHE) Parental Attitudes to Child Bilingualism

Language exposure

PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
M	0, 1	1	0	0	
F	*	0	0	0	0

Key: 0=English, 1=Spanish, *=other language

^a Language exposure patterns are listed for statistical computation as binary measures. English is listed with the classification 0, while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 6.3 (SHE) Language Exposure Patterns in the Home ^a

PARENT	Weekdays ^a	Weekends ^a	Week Average ^a	% of Weekly Time	Class.
M	4	10	6	58	1
F	2	8	4	37	0

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 6.4 (SHE) Time Under Parental Supervision

LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
E	30	42	100	1
S	0	0	0	0
Total	30	42		

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 6.5 (SHE) Language Exposure Outside the Home

Conversational data

Language exposure

PARENT	Spanish	English	Mixing		
			Total	Turn	Utterance
M	86	7	7	4	3
F ^b	0	100	0	0	0
Average	43	54	3	2	1

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b information about the father not obtained through recorded data

Table 6.6 (SHE) Parental Language Use in Conversation (by Parent)^a

PARENT	Context	Spanish	English	Mixing		
				Total	Turn	Utterance
M	free c. story	87	7	6	3	3
		85	6	9	5	4
F ^b	free c. story	0	100	0	0	0
		0	100	0	0	0
Average	free c. story	43	54	3	2	1
		43	53	4	2	2

Key: Context: free c.=free conversation; story=story reading
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b information about the father not obtained through recorded data

Table 6.7 (SHE) Parental Language Use in Conversation (by Context)^a

PARENT	Topic	Spanish	English	Mixing		
				Total	Turn	Utterance
M	n/Sp	87	7	6	4	2
	Eng	86	6	8	3	5
F ^b	n/Sp	0	100	0	0	0
	Eng	0	100	0	0	0
Average	n/Sp	43	54	3	2	1
	Eng	43	53	4	2	2

Key: Topic: n/Sp=culturally neutral / minority culture: Eng=related to community culture
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b information about the father not obtained through recorded data

Table 6.8 (SHE) Parental Language Use in Conversation (by Topic)^a

PARENT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
M	11	9	19	44	17
F	—	—	—	—	—
Average ^b	11	9	19	44	17

Key: — = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.9a (SHE) Parental Response to Child's Mixing (by Parent)^a

PARENT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
M	39	61	0
F	—	—	—
Average ^b	39	61	0

Key: Trend: 0=acceptance; 1=correction

— = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.9b (SHE) Parental Response to Child's Mixing (by Trend)^a

DEPENDENT VARIABLES

Conversational data

Linguistic competence

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	2;2	2.86	2.56	6.0	5.8		1
2	2;8	1.77*	1.52*	3.6	2.8	Low amount of data	0
3	2;11	1.46*	1.35*	3.6	3.0	Low amount of data	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.10 (SHE) Grammatical Complexity in MLU Classifications (Spanish)

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	2;2	3.51	3.34	7.4	7.4		1
2	2;8	2.72	2.58	7.0	6.6	Low amount of data	1
3	2;11	3.63	3.51	7.2	7.0	Low amount of data	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.11 (SHE) Grammatical Complexity in MLU Classifications (English)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Comments	Class.
1	2;2	71/130	.54	44.98		1
2	2;8	29/60*	.48*	14.80*	Low amount of data	0
3	2;11	30/60*	.50*	14.77*	Low amount of data	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.12 (SHE) Lexical Variety in TTR & VOCD Classifications (Spanish)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Comments	Class.
1	2;2	74/169	.43	45.58		1
2	2;8	58/127	.45	31.51	Low amount of data	1
3	2;11	67/166	.40	34.73	Low amount of data	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.13 (SHE) Lexical Variety in TTR & VOCD Classifications (English)

Age Range ^a			2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0	Obs.
S T R U C T U R E	Noun Phrase	N (plural)			X ○											1
		Det + N (pl., fem.)								○	X					1
		(Det) + N + Adj		○	X											1
	Verb Phrase	Present ind. hab. (sg/pl)	◇	○	X											1
		Present ind. continuous			○		□									0
		Pres. Perfect		○	□											0
		Preterit			○□									(X)		0
		Imperfect				○□										0
		Imp. cont.												○		0
		Periphrastic future	◇		○		□									0
		Reflexive <i>se</i>				○										0
		Impersonal <i>hay</i>	○													0
		Imperative Negative		○												0
		Present Subjunctive							○□							0
	Nega- tion	<i>no</i> + V	○		X											1
		<i>no</i> + Adj.	*		X											1
		Subj. + <i>no</i>	○		X											1
		<i>no</i> + V + Obj.			X ○											1
		Subj. + <i>no</i> + V + Obj.							*							0
	Wh- Ques.	Wh + V		○										X		0
		Wh + V + Obj.							○					X		0

Key: ^a Age in bold corresponds to available data

Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

ind.=indicative

hab.=habitual

X = Sheila

(X) = appears only once in the data

○ = Rafael (Hernández Pina 1990)

□ = Maria (Mueller Gathercole, Sebastián and Soto 1999)

◇ = Maria (Fernández 1994)

* = Peru (Meisel 1994b)

Table 6.14 (SHE) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Ling. Stage ^a		1	2	3	4	5	Class.
Age Range		1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5	
S T R U C T U R E	Noun Phrase	(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4	1
	Age ^b	2;2	2;2 ^c	2;2	2;8		
	Verb Phrase	Lone verb	Marked v. '-ing' w/out <i>be</i> or catenative	Pres. Aux <i>can, will, be</i>	Main V and Aux in Past. Past modals	Past <i>be have</i> + -en Aux + NP	1
	Age	2;2	2;2	2;2	2;8 ^c /2;11 ^d	—	
	Negation	<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be, can, will, do, does.</i> Past <i>did</i>	Past tense and modals Cat + NP <i>be</i> + -ing	1
	Age	2;2	2;2	—	2;11	—	
	Yes/No Ques.	Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be, can, will, do</i>		1
	Age	2;2	2;2	2;2	2;2 ^c		
	Wh-Ques.	<i>what</i> + (<i>this/that</i>) <i>what</i> + (NP) + <i>do</i> + (-ing) <i>where</i> + (NP) + <i>go</i> + (-ing)	<i>what</i> + (N) + V <i>where</i> + (N) + V	Aux without inversion. <i>Why, who, how</i>	<i>Do...?</i> Aux inverted. <i>Be, can, will, do. When...?</i>		1
	Age	2;2	2;2	2;8	2;8		

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

— = no evidence found in the data

^a Linguistic stages according to Brown's labels (1973)

^b Age in which the form appears and/or becomes regularized

^c Form appears only once in the data

^d Form becomes regularized

Table 6.15 (SHE) Morphosyntactic Development in English (Based on Miller 1981)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;2	2.86	2.56	6.0	5.8	.54	44.98	NP (N plural); Pres. ind. hab.; Neg.	1
2	2;8	1.77*	1.52*	3.6	2.8	.48*	14.80*	NP (Det + NP, pl., fem.)	0
3	2;11	1.46*	1.35*	3.6	3.0	.50*	14.77*	Preterit Wh-Questions	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.16 (SHE) Summary of Linguistic Competence Measurements (Spanish)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;2	3.51	3.34	7.4	7.4	.43	45.58	NP (1,2,3) ^a ; VP (1, 2,3); Neg (1,2); y/n (1,2,3,4); Wh-Q. (1,2)	1
2	2;8	2.72	2.58	7.0	6.6	.45	31.51	NP (4); VP (4); Wh-Q. (3,4)	1
3	2;11	3.63	3.51	7.2	7.0	.40	34.73	VP (4) Neg (4)	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
^a Corresponding linguistic stage

Table 6.17 (SHE) Summary of Linguistic Competence Measurements (English)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	2.86	2.56	6.0	5.8	.54	44.98	NP (N plural); Pres. ind. hab.; Neg.	1
2;5 – 2;9	1.77*	1.52*	3.6	2.8	.48*	14.80*	NP (Det + NP, pl., fem.)	0
2;10 – 3;3	1.46*	1.35*	3.6	3.0	.50*	14.77*	Preterit Wh-Questions	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.18 (SHE) Summary of Linguistic Competence Measurements in Age Blocks (Spanish)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	3.51	3.34	7.4	7.4	.43	45.58	NP (1,2,3); VP (1, 2,3); Neg (1,2); y/n (1,2,3,4); Wh-Q. (1,2)	1
2;5 – 2;9	2.72	2.58	7.0	6.6	.45	31.51	NP (4); VP (4); Wh-Q. (3,4)	1
2;10 – 3;3	3.63	3.51	7.2	7.0	.40	34.73	VP (4) Neg (4)	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.19 (SHE) Summary of Linguistic Competence Measurements in Age Blocks (English)

PARENT	Spanish		English		Mixing						Class.
	Parent	Child	Parent	Child	Total		Turn		Utterance		
					Parent	Child	Parent	Child	Parent	Child	
M	86	37	7	51	7	12	4	5	3	7	0
F ^b	0	0	100	100	0	0	0	0	0	0	1
Average	43	19	54	75	3	6	2	2	1	4	0

Key: Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b information about the father not obtained through recorded data

Table 6.20 (SHE) Child Code Use in Conversation (by Parent)^a

Age Range	Parent	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
2;0–2;4	M	85	37	8	51	7	12	3	4	4	8	0
	F	0	0	100	100	0	0	0	0	0	0	1
2;5–2;9	M	90	31	2	58	8	11	2	6	6	5	0
	F	0	0	100	100	0	0	0	0	0	0	1
2;10–3;3	M	96	47	1	47	3	6	3	5	0	1	0
	F	0	0	100	100	0	0	0	0	0	0	1

Key: Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 6.21 (SHE) Child Code Use in Conversation (in Age Blocks)^a

PARENT	Context	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	free c. story	87	36	7	53	6	11	3	4	3	7	0
		85	38	6	49	9	13	5	5	4	8	0
F	free c. story	0	0	100	100	0	0	0	0	0	0	1
		0	0	100	100	0	0	0	0	0	0	1
Average	free c. story	44	18	53	77	3	5	2	2	1	3	0
		43	19	53	75	4	6	2	2	2	4	0

Key: Context: free c.=free conversation; story=story reading

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 6.22 (SHE) Child Code Use in Conversation (by Context)^a

PARENT	Topic	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	n/Sp	87	37	7	51	6	12	4	5	2	7	0
	Eng	86	35	6	54	8	11	3	3	5	8	0
F	n/Sp	0	0	100	100	0	0	0	0	0	0	1
	Eng	0	0	100	100	0	0	0	0	0	0	1
Average	n/Sp	43	18	54	76	3	6	2	3	1	3	0
	Eng	43	17	53	77	4	6	2	2	2	4	0

Key: Topic: n/Sp=culturally neutral / minority culture; Eng=related to community culture

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 6.23 (SHE) Child Code Use in Conversation (by Topic)^a

PARENT	Turn	Utterance	Total Mixing	Class.
M	51	7.1	58.1	0
F	0	0	0	1
Average	25.5	3.5	29	0

Key: Classification: 0=not comparable to other normally developing bilinguals

1= comparable to other normally developing bilinguals ($\pm 5\%$)

^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 6.24 (SHE) Mixing of Child Codes in Conversation^a

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (Spanish)	M	1
			F	0
		Parental Attitudes to Child Bilingualism	M	1
			F	0
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	0
		Amount of Time Under Parental Supervision	M	1
			F	0
Language Exposure Outside the Home (Spanish)			0	
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (Spanish)	M	86%
			F	0%
		Parental Response to Child's Mixing	M	0
			F	—
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		0
		Lexical Diversity (TTR; VOCD)		0
		Morphosyntactic Development (ling. milestones)		0
	Language Use	Language of Response to Input Language in Conversation (Spanish)	M	37%
			F	0%
		Mixing of Child Codes in Conversation (Sp. to Eng.)	M	0
			F	—

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

— = information not available or insufficient

Table 6.25 (SHE) Summary of Classification of Variables (Spanish)

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (English)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	1
			F	0
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	0
		Amount of Time Under Parental Supervision	M	1
			F	0
Language Exposure Outside the Home (English)			1	
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (English)	M	7%
			F	100%
		Parental Response to Child's Mixing	M	0
			F	—
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (English)	Grammatical Complexity (MLUm/w; MLUmax)		1
		Lexical Diversity (TTR; VOCD)		1
		Morphosyntactic Development (ling. milestones)		1
	Language Use	Language of Response to Input Language in Conversation (English)	M	51%
			F	100%
		Mixing of Child Codes in Conversation (Eng. to Sp.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.
Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.
Language Exposure Patterns in the Home: 0=English; 1=Spanish
Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%
Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%
Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation
Parental Response to Child's Mixing: 0=acceptance; 1=correction
Child's Linguistic Competence (English): 0=not comparable to monolingual data; 1=comparable
Language of Response to Input Language in Conversation (English): absolute percentage
Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data
 — = information not available or insufficient

Table 6.26 (SHE) Summary of Classification of Variables (English)

6.1.6 Antonio

INDEPENDENT VARIABLES

Preconditions

Parental background

Parental background classifications (Class.) are listed for statistical computation as binary measures, with Classifications indicating proficiency between 1 and 3 listed as 0, while Classification between 3.5 and 5 is assigned a value of 1.

PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average Level	Class.
M	E	4	4	4	4	1
	S	5	5	5	5	1
F	E	4	3	4	3.5	1
	S	1	1	1	1	0

Key: Parent: M=Mother; F=Father
Language: E=English; S=Spanish
Level: 5=naive; 4=superior; 3=advanced; 2=intermediate; 1=noVICE; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.1 (ANT) Parental Linguistic Competence in each Language

PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
M	4	5	4	4.5	1
F	4	3	2	3	0

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.2 (ANT) Parental Attitudes to Child Bilingualism

Language exposure

PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
M	1	1	0	0	0
F	*	0	0	0	0

Key: 0=English, 1=Spanish, *=other language

^a Language exposure patterns are listed for statistical computation as binary measures. English is listed with the classification 0, while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 6.3 (ANT) Language Exposure Patterns in the Home ^a

PARENT	Weekdays ^a	Weekends ^a	Week Average ^a	% of Weekly Time	Class.
M	4	10	6	58	1
F	2	10	4	43	0

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 6.4 (ANT) Time Under Parental Supervision

LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
E	20	30	70	1
S	9	12	30	0
Total	29	42		

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 6.5 (ANT) Language Exposure Outside the Home

Conversational data

Language exposure

PARENT	Spanish	English	Mixing		
			Total	Turn	Utterance
M	94	1	5	2	3
F ^b	0	100	0	0	0
Average	47	51	2	1	1

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b limited recorded data with the father available

Table 6.6 (ANT) Parental Language Use in Conversation (by Parent)^a

PARENT	Context	Spanish	English	Mixing		
				Total	Turn	Utterance
M	free c. story	95	0 ^b	5	1	4
		93	3	4	2	2
F ^c	free c. story	0	100	0	0	0
		0	100	0	0	0
Average	free c. story	48	50	2	0	2
		47	52	2	1	1

Key: Context: free c.=free conversation; story=story reading
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%
^c limited recorded data with the father available

Table 6.7 (ANT) Parental Language Use in Conversation (by Context)^a

PARENT	Topic	Spanish	English	Mixing		
				Total	Turn	Utterance
M	n/Sp	97	0 ^b	3	1	2
	Eng	86	3	11	3	8
F ^c	n/Sp	0	100	0	0	0
	Eng	0	100	0	0	0
Average	n/Sp	48	50	2	0	2
	Eng	43	52	5	1	4

Key: Topic: n/Sp=culturally neutral / minority culture; Eng=related to community culture
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%
^c limited recorded data with the father available

Table 6.8 (ANT) Parental Language Use in Conversation (by Topic)^a

PARENT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
M	16	6	9	62	7
F	—	—	—	—	—
Average ^b	16	6	9	62	7

Key: — = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.9a (ANT) Parental Response to Child's Mixing (by Parent)^a

PARENT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
M	22	78	0
F	—	—	—
Average ^b	22	78	0

Key: Trend: 0=acceptance; 1=correction

— = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b due to lack of data from the father, only the data from the mother is considered in the average

Table 6.9b (ANT) Parental Response to Child's Mixing (by Trend)^a

DEPENDENT VARIABLES

Conversational data

Linguistic competence

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	2;11	2.76	2.32	6.8	6.0		0
2	3;0	5.34	4.38	12.8	10.2	After visit to Spain	1
3	3;1	3.82	2.86	9.2	6.2		0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.10 (ANT) Grammatical Complexity in MLU Classifications (Spanish)

Recording Session Group	Age	MLU		MLUmax		Comments	Class.
		morphemes	words	morphemes	words		
1	2;11	3.74	3.58	9.0	8.6		1
2	3;0	3.42*	3.31*	6.6	6.2	Spanish conversation	0
3	3;1	3.79*	2.66*	5.4	5.2	Spanish conversation	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.11 (ANT) Grammatical Complexity in MLU Classifications (English)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Comments	Class.
1	2;11	64/112	.57	38.97		0
2	3;0	99/211	.46	47.91	After visit to Spain	1
3	3;1	69/141	.48	49.87		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.12 (ANT) Lexical Variety in TTR & VOCD Classifications (Spanish)

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Comments	Class.
1	2;11	78/174	.44	34.04		1
2	3;0	68/120*	.56*	47.51*	Spanish conversation	0
3	3;1	60/103*	.58*	47.28*	Spanish conversation	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
Based on less than 50 utterances (20 and up)

Table 6.13 (ANT) Lexical Variety in TTR & VOCD Classifications (English)

Age Range ^a			2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0	Obs.
S T R U C T U R E	Noun Phrase	N (plural)			o									X		—
		Det + N (pl., fem.)								o				X		—
		(Det) + N + Adj		o										X		—
	Verb Phrase	Present ind. hab. (sg/pl)	◊	o										X		—
		Present ind. continuous			o		□							X		—
		Pres. Perfect		o	□										X	—
		Preterit			o□									X		—
		Imperfect				o□									X	—
		Imp. cont.												o		0
		Periphrastic future	◊		o		□							X		—
		Reflexive <i>se</i>				o								X		—
		Impersonal <i>hay</i>	o													0
		Imperative Negative		o												0
		Present Subjunctive							o□							0
	Nega- tion	<i>no</i> + V	o											X		—
		<i>no</i> + Adj.	*											X		—
		Subj. + <i>no</i>	o											X		—
		<i>no</i> + V + Obj.			o									X		—
		Subj. + <i>no</i> + V + Obj.							*					X		—
	Wh- Ques.	Wh + V		o										X		—
		Wh + V + Obj.							o					X		—

Key: ^a Age in bold corresponds to available data

Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

ind.=indicative

hab.=habitual

X = Antonio

o = Rafael (Hernández Pina 1990)

□ = Maria (Mueller Gathercole, Sebastián and Soto 1999)

◊ = Maria (Fernández 1994)

* = Peru (Meisel 1994b)

— = impossible to determine due to lack of earlier data

Table 6.14 (ANT) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Ling. Stage ^a		1	2	3	4	5	Class.
Age Range		1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5	
S T R U C T U R E	Noun Phrase	(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4	1
	Age ^b	2;11	2;11	2;11	2;11		
	Verb Phrase	Lone verb	Marked v. '-ing' w/out <i>be</i> or catenative	Pres. Aux <i>can, will, be</i>	Main V and Aux in Past. Past modals	Past <i>be have + -en</i> Aux + NP	1
	Age	—	—	2;11	2;11	2;11 ^c	
	Negation	<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be, can, will, do, does.</i> Past <i>did</i>	Past tense and modals Cat + NP <i>be + -ing</i>	1
	Age	—	2;11	—	2;11	—	
	Yes/No Ques.	Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be, can, will, do</i>		1
	Age	2;11	2;11	2;11	2;11		
	Wh-Ques.	<i>what + (this/that)</i> <i>what + (NP)</i> <i>+ do + (-ing)</i> <i>where + (NP)</i> <i>+ go + (-ing)</i>	<i>what + (N)</i> <i>+ V</i> <i>where + (N)</i> <i>+ V</i>	Aux without inversion. <i>Why, who, how</i>	<i>Do...?</i> Aux inverted. <i>Be, can, will, do.</i> <i>When...?</i>		1
	Age	2;11	2;11	2;11	2;11		

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

— = no evidence found in the data

^a Linguistic stages according to Brown's labels (1973)

^b Age in which the form appears and/or becomes regularized

^c Form appears only once in the data

Table 6.15 (ANT) Morphosyntactic Development in English (Based on Miller 1981)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;11	2.76	2.32	6.8	6.0	.57	38.97	NP; Pres. ind. hab./con.; Pret.; P. fut.; se; Neg.; Wh.Q.	0
2	3;0	5.34	4.38	12.8	10.2	.46	47.91	Pres. Perfect; Imperfecto	1
3	3;1	3.82	2.86	9.2	6.2	.48	49.87		0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.16 (ANT) Summary of Linguistic Competence Measurements (Spanish)

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;11	3.74	3.58	9.0	8.6	.44	34.04	NP (1,2,3,4) ^a ; VP (3, 4,5); Neg (1,2); y/n (1, 2,3,4); Wh-Q. (1,2,3,4)	1
2	3;0	3.42*	3.31*	6.6	6.2	.56*	47.51*		0
3	3;1	3.79*	2.66*	5.4	5.2	.58*	47.28*		0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
^a Corresponding linguistic stage

Table 6.17 (ANT) Summary of Linguistic Competence Measurements (English)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	—	—	—	—	—	—	—	—
2;5 – 2;9	—	—	—	—	—	—	—	—
2;10 – 3;3	3.97	3.18	9.6	7.4	.50	45.58	NP; Pres. ind. hab./con.; Pret.; P. fut.; se; Neg.; Wh.Q.; P. Perf.; Imperf.	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 — = data not available

Table 6.18 (ANT) Summary of Linguistic Competence Measurements in Age Blocks (Spanish)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0 – 2;4	—	—	—	—	—	—	—	—
2;5 – 2;9	—	—	—	—	—	—	—	—
2;10 – 3;3	3.28	3.14	7.2	7.0	.42	37.27	NP (1,2,3,4); VP (3, 4,5); Neg (1,2); y/n (1, 2,3,4); Wh-Q. (1,2,3,4)	0

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 6.19 (ANT) Summary of Linguistic Competence Measurements in Age Blocks (English)

PARENT	Spanish		English		Mixing						Class.
					Total		Turn		Utterance		
	Parent	Child	Parent	Child	Parent	Child	Parent	Child	Parent	Child	
M	94	65	1	22	5	13	2	3	3	10	0
F ^b	0	0	100	100	0	0	0	0	0	0	1
Average	47	33	51	61	2	6	1	1	1	5	0

Key: Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b limited recorded data with the father available

Table 6.20 (ANT) Child Code Use in Conversation (by Parent)^a

Age Range	Parent	Spanish		English		Mixing						Class.
						Total		Turn		Utterance		
		Parent	Child	Parent	Child	Parent	Child	Parent	Child	Parent	Child	
2;0–2;4	M F	—	—	—	—	—	—	—	—	—	—	—
2;5–2;9	M F	—	—	—	—	—	—	—	—	—	—	—
2;10–3;3	M F	94 0	65 0	1 100	22 100	5 0	13 0	2 0	3 0	3 0	10 0	0 1

Key: Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

— = data not available

Table 6.21 (ANT) Child Code Use in Conversation (in Age Blocks)^a

PARENT	Context	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	free c. story	95	69	0 ^b	18	5	13	1	3	4	10	0
		93	58	6	29	4	13	2	1	2	12	0
F	free c. story	0	0	100	100	0	0	0	0	0	0	1
		0	0	100	100	0	0	0	0	0	0	1
Average	free c. story	48	35	50	59	2	6	0	1	2	5	0
		47	29	52	64	2	6	1	0	1	6	0

Key: Context: free c.=free conversation; story=story reading

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.22 (ANT) Child Code Use in Conversation (by Context)^a

PARENT	Topic	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
M	n/Sp	97	72	0 ^b	17	3	11	1	2	2	9	0
	Eng	86	42	3	37	11	21	3	4	8	17	0
F	n/Sp	0	0	100	100	0	0	0	0	0	0	1
	Eng	0	0	100	100	0	0	0	0	0	0	1
Average	n/Sp	48	36	50	59	2	5	0	1	2	5	0
	Eng	43	21	52	69	5	10	1	2	4	8	0

Key: Topic: n/Sp=culturally neutral / minority culture; Eng=related to community culture

Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.23 (ANT) Child Code Use in Conversation (by Topic)^a

PARENT	Turn	Utterance	Total Mixing	Class.
M	25	10	35	0
F	0	0	0	1
Average	12.5	5	17.5	0

Key: Classification: 0=not comparable to other normally developing bilinguals

1= comparable to other normally developing bilinguals ($\pm 5\%$)

^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 6.24 (ANT) Mixing of Child Codes in Conversation^a

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (Spanish)	M	1
			F	0
		Parental Attitudes to Child Bilingualism	M	1
			F	0
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	0
		Amount of Time Under Parental Supervision	M	1
			F	0
		Language Exposure Outside the Home (Spanish)		
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (Spanish)	M	94%
			F	0%
		Parental Response to Child's Mixing	M	0
			F	—
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		0
		Lexical Diversity (TTR; VOCD)		1
		Morphosyntactic Development (ling. milestones)		0
	Language Use	Language of Response to Input Language in Conversation (Spanish)	M	65%
			F	0%
		Mixing of Child Codes in Conversation (Sp. to Eng.)	M	0
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

— = information not available or insufficient

Table 6.25 (ANT) Summary of Classification of Variables (Spanish)

VARIABLES			Parent	Classification
INDEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (English)	M	1
			F	1
		Parental Attitudes to Child Bilingualism	M	1
			F	0
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	0
		Amount of Time Under Parental Supervision	M	1
			F	0
			Language Exposure Outside the Home (English)	
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (English)	M	1%
			F	100%
		Parental Response to Child's Mixing	M	0
			F	—
DEPENDENT				
Conversational Data (empirical)	Linguistic Competence (English)	Grammatical Complexity (MLUm/w; MLUmax)		0
		Lexical Diversity (TTR; VOCD)		0
		Morphosyntactic Development (ling. milestones)		1
	Language Use	Language of Response to Input Language in Conversation (English)	M	22%
			F	100%
		Mixing of Child Codes in Conversation (Eng. to Sp.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (English): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (English): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

— = information not available or insufficient

Table 6.26 (ANT) Summary of Classification of Variables (English)

6.1.7 Subject Comparison

The following tables summarize and compare the results from all six subjects in the study. The organization of the tables is maintained as before. The synopsis of linguistic competence outcome (tables 6.16, 6.17 and 6.18) as well as tables condensing data results (tables 6.19 and 6.21) are not included in this part.

INDEPENDENT VARIABLES

Preconditions

Parental background

PARTICIPANT	PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average Level	Class.
CAR	M	E	4	3	4	3.5	1
		S	5	5	5	5	1
	F	E	5	5	5	5	1
		S	3	4	4	3.5	1
ALB	M	E	5	5	5	5	1
		S	4	4	4	4	1
	F	E	5	5	5	5	1
		S	3	3	3	3	0
JOH	M	E	5	5	5	5	1
		S	2	2	2	2	0
	F	E	4	3	4	3.5	1
		S	5	5	5	5	1
TIN	M	E	4	4	4	4	1
		S	5	5	5	5	1
	F	E	5	5	5	5	1
		S	4	4	4	4	1
SHE	M	E	5	5	5	5	1
		S	4	5	4	4.5	1
	F	E	5	5	5	5	1
		S	1	1	1	1	0
ANT	M	E	4	4	4	4	1
		S	5	5	5	5	1
	F	E	4	3	4	3.5	1
		S	1	1	1	1	0

Key: Parent: M=Mother; F=Father

Language: E=English; S=Spanish

Level: 5=naive; 4=superior; 3=advanced; 2=intermediate; 1=novice; 0=insufficient evidence

Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.1 (CHI) Parental Linguistic Competence in each Language

PARTICIPANT	PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
CAR	M	5	5	5	5	1
	F	5	5	4	4.5	1
ALB	M	4	5	4	4.5	1
	F	4	3	2	3	0
JOH	M	3	4	2	3	0
	F	4	5	5	4.5	1
TIN	M	5	5	5	5	1
	F	5	5	4	4.5	1
SHE	M	4	5	5	4.5	1
	F	2	1	1	1.5	0
ANT	M	4	5	4	4.5	1
	F	4	3	2	3	0

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence

Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 6.2 (CHI) Parental Attitudes to Child Bilingualism

PARTICIPANT	PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
CAR	M	1	1	1	1	1
	F	0	1	1	1	
ALB	M	0	1	0	0	0
	F	0	0	0	0	
JOH	M	0	0	0	0	0
	F	1	1	0	0	
TIN	M	1	1	1	1	1
	F	0	1	1	1	
SHE	M	0, 1	1	0	0	0
	F	*	0	0	0	
ANT	M	1	1	0	0	0
	F	*	0	0	0	

Key: 0=English, 1=Spanish, *=other language

² Language exposure patterns are listed for statistical computation as binary measures.

English is listed with the classification 0, while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 6.3 (CHI) Language Exposure Patterns in the Home ²

PARTICIPANT	PARENT	Weekdays ^a	Weekends ^a	Week Average ^a	% of Weekly Time	Class.
CAR	M	6	10	7	70	1
	F	4	10	6	58	1
ALB	M	6	10	7	70	1
	F	3	10	5	50	0
JOH	M	5	10	6	64	1
	F	2	10	4	43	0
TIN	M	6	10	7	70	1
	F	2	10	4	43	0
SHE	M	4	10	6	58	1
	F	2	8	4	37	0
ANT	M	4	10	6	58	1
	F	2	10	4	43	0

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 6.4 (CHI) Time Under Parental Supervision

PARTICIPANT	LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
CAR	E	10	15	50	0
	S	10	15	50	0
ALB	E	10	15	50	0
	S	10	15	50	0
JOH	E	25	36	100	1
	S	0	0	0	0
TIN	E	20	30	100	1
	S	0	0	0	0
SHE	E	30	42	100	1
	S	0	0	0	0
ANT	E	20	30	70	1
	S	9	12	30	0

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 6.5 (CHI) Language Exposure Outside the Home

Conversational data

Language exposure

PARTICIPANT	PARENT	Spanish	English	Mixing		
				Total	Turn	Utterance
CAR	M	95	2	3	3	0 ^b
	F	92	3	5	4	1
ALB	M	65	25	10	9	1
	F	38	54	8	6	2
JOH	M	8	79	13	8	5
	F	95	2	3	3	3
TIN	M	94	1	5	4	1
	F ^c	90	5	5	4	1
SHE	M	86	7	7	4	3
	F ^c	0	100	0	0	0
ANT	M	94	1	5	2	3
	F ^c	0	100	0	0	0

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

^c information about the father limited or not obtained through recorded data

Table 6.6 (CHI) Parental Language Use in Conversation (by Parent)^a

PARTICIPANT	PARENT	Context	Spanish	English	Mixing		
					Total	Turn	Utterance
CAR	M	free c. story	97	1	2	2	0 ^b
			95	2	3	3	0
	F	free c. story	95 84	2 8	3 8	2 7	1 1
ALB	M	free c. story	75	15	10	10	0
			34	56	10	9	1
	F	free c. story	32 64	61 25	7 11	6 8	1 3
JOH	M	free c. story	8	85	7	4	3
			8	74	18	10	8
	F	free c. story	96 94	2 1	2 5	1 3	1 2
TIN	M	free c. story	93	2	5	4	1
			96	1	3	3	0
	F	free c. story	— —	— —	— —	— —	— —
SHE	M	free c. story	87	7	6	3	3
			85	6	9	5	4
	F	free c. story	0 0	100 100	0 0	0 0	0 0
ANT	M	free c. story	95	0	5	1	4
			93	3	4	2	2
	F	free c. story	0 0	100 100	0 0	0 0	0 0

Key: Context: free c.=free conversation; story=story reading

— = information not available or insufficient

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.7a (CHI) Parental Language Use (by Parent and Context)^a

PARTICIPANT	CONTEXT	Spanish	English	Mixing		
				Total	Turn	Utterance
CAR	free c.	96	1	3	2	1
	story	86	7	7	7	0 ^b
ALB	free c.	50	41	9	8	1
	story	49	41	10	8	2
JOH	free c.	52	44	4	2	2
	story	51	38	11	6	5
TIN	free c.	93	2	5	4	1
	story	96	1	3	3	0
SHE	free c.	43	54	3	2	1
	story	43	53	4	2	2
ANT	free c.	48	50	2	0	2
	story	47	52	2	1	1

Key: Context: free c.=free conversation; story=story reading

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.7b (CHI) Parental Language Use (by Context)^a

Averages for tables 6.7a, 6.7b and 6.8a, 6.8b below are based on total number of turns. There are larger amounts of data corresponding to “free conversation” with respect to “story”. Likewise, the conversational topic categorized as “neutral/Spanish” contains more data than the category “English”.

PARTICIPANT	PARENT	Topic	Spanish	English	Mixing		
					Total	Turn	Utterance
CAR	M	n/Sp	97	1	2	2	0 ^b
		Eng	78	7	15	12	3
	F	n/Sp	96	2	2	2	0
		Eng	66	15	19	16	3
ALB	M	n/Sp	68	23	9	8	1
		Eng	43	40	17	16	1
	F	n/Sp	40	53	7	6	1
		Eng	13	82	5	5	0
JOH	M	n/Sp	9	79	12	7	5
		Eng	3	76	21	18	3
	F	n/Sp	95	2	3	1	2
		Eng	89	7	4	4	0
TIN	M	n/Sp	96	1	4	3	1
		Eng	83	5	12	9	3
	F	n/Sp	—	—	—	—	—
		Eng	—	—	—	—	—
SHE	M	n/Sp	87	7	6	4	2
		Eng	86	6	8	3	5
	F	n/Sp	0	100	0	0	0
		Eng	0	100	0	0	0
ANT	M	n/Sp	97	0	3	1	2
		Eng	86	3	11	3	8
	F	n/Sp	0	100	0	0	0
		Eng	0	100	0	0	0

Key: Topic: Eng=related to community culture; n/Sp=culturally neutral / minority culture
 — = information not available or insufficient

^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.8a (CHI) Parental Language Use (by Parent and Topic)^a

PARTICIPANT	TOPIC	Spanish	English	Mixing		
				Total	Turn	Utterance
CAR	n/Sp	97	1	2	2	0 ^b
	Eng	72	11	17	14	3
ALB	n/Sp	51	41	8	7	1
	Eng	25	65	10	9	1
JOH	n/Sp	52	41	7	4	3
	Eng	46	42	12	11	1
TIN	n/Sp	96	1	4	3	1
	Eng	83	5	12	9	3
SHE	n/Sp	43	54	3	2	1
	Eng	43	53	4	2	2
ANT	n/Sp	48	50	2	0	2
	Eng	43	52	5	1	4

Key: Topic: n/Sp=culturally neutral / minority culture; Eng=related to community culture
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b less than 1%

Table 6.8b (CHI) Parental Language Use (by Topic)^a

PARTICIPANT	PARENT	PARENTAL STRATEGIES				
		Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
CAR	M	3	3	4	43	47
	F	2	3	4	36	55
ALB	M	5	5	10	47	33
	F	1	6	17	57	19
JOH	M	2	2	2	49	45
	F	3	9	17	65	6
TIN	M	2	16	15	27	40
	F	—	—	—	—	—
SHE	M	11	9	19	44	17
	F	—	—	—	—	—
ANT	M	16	6	9	62	7
	F	—	—	—	—	—

Key: — = information not available or insufficient
^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9a (CHI) Parental Response to Child's Mixing (by Parent)^a

PARTICIPANT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
CAR	2	3	4	40	51
ALB	3	5	9	52	26
JOH	2	5	10	57	26
TIN ^b	2	16	15	27	40
SHE	11	9	19	44	17
ANT	16	6	9	62	7

Key: — = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b if information about the father is not available, the mother's absolute percentage is taken as reference

Table 6.9b (CHI) Parental Response to Child's Mixing ^a

PARTICIPANT	PARENT	TREND OF PARENTAL STRATEGIES		
		1	0	GENERAL TREND
CAR	M	10	90	0
	F	9	91	0
ALB	M	20	80	0
	F	24	76	0
JOH	M	6	94	0
	F	29	71	0
TIN	M	18	82	0
	F	—	—	—
SHE	M	39	61	0
	F	—	—	—
ANT	M	31	69	0
	F	—	—	—

Key: Trend: 1=correction; 0=acceptance

— = information not available or insufficient

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 6.9c (CHI) Parental Response to Child's Mixing (by Parent and Trend)^a

PARTICIPANT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
CAR	9	91	0
ALB	22	78	0
JOH	18	82	0
TIN ^b	18	82	0
SHE	39	61	0
ANT	31	69	0

Key: Trend: 0=acceptance; 1=correction;

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

^b if information about the father is not available, the mother's absolute percentage is taken as reference

Table 6.9d (CHI) Parental Response to Child's Mixing (by Trend)^a

DEPENDENT VARIABLES

Conversational data

Linguistic competence

Age Range	CAR		ALB		JOH		TIN		SHE		ANT	
	mor	word	mor	word	mor	word	mor	word	mor	word	mor	word
1;8			1.72*	1.52*								
1;9												
1;10												
1;11												
2;0	2.50	1.98	2.00*	1.60*	2.00*	1.80*						
2;1	2.38	1.68	2.20	1.96	1.60*	1.52*						
2;2	2.88	2.38	2.06	1.92	1.82	1.74	2.16	1.76	2.86	2.56		
2;3	3.46	2.72	3.43*	2.53*	1.96*	1.83*	3.18	2.62				
2;4	4.18	3.44	2.82	2.22			3.62	2.84				
2;5	3.96	3.00			3.22	2.78	3.90	3.06				
2;6	4.94	3.82	3.26*	2.73*								
2;7	5.38	4.20										
2;8	4.62	3.62	2.40*	1.95*					1.77*	1.52*		
2;9	3.68	2.74										
2;10	4.42	3.54	2.13**	1.66**								
2;11	4.94	3.50					5.22	3.78	1.46*	1.35*	2.76	2.32
3;0	4.92	3.86									5.34	4.38
3;1											3.82	2.86
3;2	5.26	4.14										
3;3	5.78	4.02			2.76	2.38						

Key: * Based on less than 50 utterances (20 and up)
 ** Based on less than 20 utterances (15 and up)

Table 6.10a (CHI) MLU Scores (Spanish)

Age Range	CAR		ALB		JOH		TIN		SHE		ANT	
	mor	word	mor	word	mor	word	mor	word	mor	word	mor	word
1;8			2.8	2.0								
1;9												
1;10												
1;11												
2;0	4.0	3.4	3.4	2.2	3.0	3.0						
2;1	6.4	4.6	4.6	4.0	3.2	3.0						
2;2	7.2	5.4	5.0	4.8	4.2	3.8	5.4	4.8	6.0	5.8		
2;3	8.2	5.4	5.8	4.4	3.2	3.6	7.2	6.0				
2;4	9.6	7.6	6.2	4.6			8.0	7.0				
2;5	8.8	5.6			5.8	4.6	10.6	8.0				
2;6	11.8	9.6	5.6	4.2								
2;7	13.2	11.8										
2;8	8.8	6.6	4.8	3.8					3.6	2.8		
2;9	6.0	5.2										
2;10	9.2	7.6	3.2	2.4								
2;11	10.8	7.8					15.8	11.4	3.6	3.0	6.8	6.0
3;0	13.8	11.6									12.8	10.2
3;1											9.2	6.2
3;2	14.6	12.2										
3;3	12.4	9.6			6.4	5.0						

Table 6.10b (CHI) MLUmax Scores (Spanish)

Age Range	CAR		ALB		JOH		TIN		SHE		ANT	
	mor	word	mor	word	mor	word	mor	word	mor	word	mor	word
1;8			2.62	2.56								
1;9												
1;10												
1;11												
2;0			2.40*	2.33*	2.56	2.38						
2;1			2.90	2.74	2.88	2.48						
2;2			3.52	3.26	3.00	2.94	1.54	1.36	3.51	3.34		
2;3			3.68	3.44	3.28	3.06	2.02*	1.82*				
2;4			3.52	3.34								
2;5					4.81	4.38						
2;6			4.06	3.80								
2;7			4.84	4.58								
2;8			3.64**	3.41**					2.72	2.58		
2;9												
2;10			4.56	4.38								
2;11					5.16	4.76	3.23*	3.00*	3.63	3.51	3.74	3.58
3;0			4.06	3.84							3.42*	3.31*
3;1											3.79*	2.66*
3;2	5.35*	4.65*										
3;3	4.94	4.42			5.38	5.32						

Key: * Based on less than 50 utterances (20 and up)
 ** Based on less than 20 utterances (15 and up)

Table 6.11a (CHI) MLU Scores (English)

Age Range	CAR		ALB		JOH		TIN		SHE		ANT	
	mor	word	mor	word	mor	word	mor	word	mor	word	mor	word
1;8			6.0	6.0								
1;9												
1;10												
1;11												
2;0			4.4	4.0	5.4	5.0						
2;1			7.2	6.4	6.6	4.6						
2;2			7.4	7.0	5.6	5.6	3.0	2.6	7.4	7.4		
2;3			6.2	6.0	6.8	6.2	4.8	4.2				
2;4			7.6	7.2								
2;5					10.6	9.2						
2;6			9.0	8.6								
2;7			11.6	11.4								
2;8			5.6	5.2					7.0	6.6		
2;9												
2;10			8.6	8.0								
2;11					10.4	10.0	6.6	6.2	7.2	7.0	9.0	8.6
3;0			7.4	6.6							6.6	6.2
3;1											5.4	5.2
3;2	7.2	7.0										
3;3	10.0	9.4			12.8	12.2						

Table 6.11b (CHI) MLUmax Scores (English)

Age Range	CAR		ALB		JOH		TIN		SHE		ANT	
	TTR	D	TTR	D	TTR	D	TTR	D	TTR	D	TTR	D
1;8			—	—								
1;9												
1;10												
1;11												
2;0	.53	29.83	—	—	—	—						
2;1	.66	65.02	.62	57.26	—	—						
2;2	.54	53.86	.54	39.16	.47	25.02	.57	40.11	.54	44.98		
2;3	.50	45.92	.55*	22.96*	.63*	32.26*	.44	32.38				
2;4	.51	55.12	.56	40.92			.62	70.37				
2;5	.59	77.77			.38	24.94	.40	56.03				
2;6	.43	52.70	.65*	38.85*								
2;7	.45	47.42										
2;8	.42	27.59	—	—					.48*	14.80*		
2;9	.56	59.49										
2;10	.53	70.76										
2;11	.48	59.70					.59	78.72	.50*	14.77*	.57	38.97
3;0	.30	20.09									.46	47.91
3;1											.48	49.87
3;2	.50	62.47										
3;3	.46	57.86			.52	50.75						

Key: — = insufficient tokens for random sampling
 * Based on less than 50 utterances (20 and up)

Table 6.12 (CHI) TTR & VOCD Scores (Spanish)

Age Range	CAR		ALB		JOH		TIN		SHE		ANT	
	TTR	D	TTR	D	TTR	D	TTR	D	TTR	D	TTR	D
1;8			.49	37.38								
1;9												
1;10												
1;11												
2;0			.61*	39.12*	.55	.51.69						
2;1			.51	44.35	.36	15.29						
2;2			.46	33.24	.38	24.53	.61	34.35	.43	45.58		
2;3			.47	41.69	.41	33.66	45*	16.51*				
2;4			.37	25.16								
2;5					.34	26.25						
2;6			.42	39.53								
2;7			.39	38.46								
2;8			.72**	50.68**					.45	31.51		
2;9												
2;10			.43	43.83								
2;11					.43	59.89	.65*	0.48*	.40	34.73	.44	34.04
3;0			.42	34.78							.56*	47.51*
3;1											.58*	47.28*
3;2	.55*	33.77*										
3;3	.45	45.31			.34	37.72						

Key: — = insufficient tokens for random sampling
• Based on less than 50 utterances (20 and up)
** Based on less than 20 utterances (15 and up)

Table 6.13 (CHI) TTR & VOCD Scores (English)

Age Range		2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0*
S T R U C T U R E	Noun Phrase	N (plural)	ALB JOH	CAR	TIN SHE ○								ANT	
		Det + N (pl., fem.)		ALB		CAR TIN			○				ANT	JOH
		(Det) + N + Adj		○	CAR SHE	TIN	ALB						ANT	JOH
	Verb Phrase	Present ind. hab. (sg/pl)	CAR ALB ◇	JOH ○	TIN SHE								ANT	
		Present ind. continuous		CAR	○		TIN □						ANT	
		Pres. Perfect		(ALB) ○	□			TIN						ANT
		Preterit			CAR ○□	(JOH) TIN	(ALB) [JOH]						(SHE) ANT	
		Imperfect				○□		CAR TIN						ANT
		Imp. cont.											TIN ○	CAR
		Periphrastic future	◇		○		CAR TIN □	[JOH]					ANT	
		Reflexive <i>se</i>				(JOH) ○	CAR	JOH TIN					ANT	
		Impersonal <i>hay</i>	○		CAR		TIN	JOH						
		Imperative Negative		CAR (JOH) ○				TIN						
		Present Subjunctive							○□		CAR		TIN	
	Negation	<i>no</i> + V	CAR ○	ALB JOH	SHE	TIN							ANT	
		<i>no</i> + Adj.	ALB *		CAR JOH SHE	TIN							ANT	
		Subj. + <i>no</i>	○		CAR ALB (JOH) SHE	TIN							ANT	
		<i>no</i> + V + Obj.			CAR SHE ○	ALB	TIN	JOH					ANT	
		Subj. + <i>no</i> + V + Obj.				CAR	(ALB)	TIN	*				JOH ANT	
	Wh- Ques.	Wh + V		○		CAR	TIN						JOH SHE ANT	
		Wh + V + Obj.					TIN	CAR	○				JOH SHE ANT	

Key: * structures appear at 3;0 or after

ind.=indicative; hab.=habitual

CAR = Carmen; ALB = Alberto; JOH = John; TIN = Tina; SHE = Sheila; ANT = Antonio

(CHI) = appears only once in the data ; [CHI] = appears repeatedly but only in one verb form

○ = Rafael (Hernández Pina 1990) ; □ = María (Mueller Gathercole, Sebastián and Soto 1999)

◇ = María (Fernández 1994); * = Peru (Meisel 1994b)

Table 6.14 (CHI) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Ling. Stage ^a			1	2	3	4	5
Age Range			1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5
S T R U C T U R E	Noun Phrase		(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4
	Age ^b	CAR	2;0	2;0 ^c /2;5 ^d	2;0/2;7	2;9	
		ALB	1;8	1;8	2;1	2;4	
		JOH	2;0	2;0	2;0	2;2	
		TIN	2;2	2;5	2;11	2;11	
		SHE	2;2	2;2 ^c	2;2	2;8	
		ANT	2;11	2;11	2;11	2;11	
	Verb Phrase		Lone verb	Marked v. '-ing' w/out <i>be</i> or catenative	Pres. Aux <i>can, will, be</i>	Main V and Aux in Past. Past modals	Past <i>be</i> <i>have</i> + -en Aux + NP
	Age	CAR	2;0	2;6	2;9	—	3;2
		ALB	1;8	1;8 ^c	2;0 ^c /2;2 ^d	2;0 ^c /2;4 ^d	2;6 ^c
		JOH	2;0	2;0	2;0 ^c /2;3 ^d	2;5 ^c /2;11 ^d	3;3
		TIN	2;2	2;11	2;11	—	—
		SHE	2;2	2;2	2;2	2;8 ^c /2;11 ^d	—
		ANT	—	—	2;11	2;11	2;11 ^c
	Negation		<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be, can, will, do, does.</i> Past <i>did</i>	Past tense and modals Cat + NP <i>be</i> + -ing
	Age	CAR	2;7	2;7	—	2;9	3;3
		ALB	1;8	2;1	—	2;2 ^c /2;4 ^d	—
		JOH	2;0	2;1	—	2;11	—
		TIN	2;2	2;2 ^c	—	—	—
		SHE	2;2	2;2	—	2;11	—
		ANT	—	2;11	—	2;11	—
	Yes/No Ques.		Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be, can, will, do</i>	
	Age	CAR	—	—	—	2;9	
		ALB	1;8	1;8	1;8	2;2	
		JOH	2;0	2;0	2;0	2;3 ^c /2;5 ^d	
		TIN	—	—	—	—	
		SHE	2;2	2;2	2;2	2;2 ^c	
		ANT	2;11	2;11	2;11	2;11	
	Wh- Ques.		<i>what</i> + (<i>this/that</i>) <i>what</i> + (NP) + <i>do</i> + (-ing) <i>where</i> + (NP) + <i>go</i> + (-ing)	<i>what</i> + (N) + V <i>where</i> + (N) + V	Aux without inversion. <i>Why, who, how</i>	<i>Do...?</i> Aux inverted. <i>Be, can, will, do.</i> <i>When...?</i>	
	Age	CAR	—	—	—	—	
		ALB	2;1	2;2	2;2 ^c /2;4 ^d	2;3 ^c /2;4 ^d	
		JOH	2;0	2;0 ^c /2;2 ^d	2;0 ^c /2;1 ^d	2;3 ^c /3;3 ^d	
		TIN	—	—	—	—	
		SHE	2;2	2;2	2;8	2;8	
		ANT	2;11	2;11	2;11	2;11	

Key: — = no evidence found in the data

^a Linguistic stages according to Brown's labels (1973)

^b Age in which the form appears and/or becomes regularized

^c Form appears only once in the data

^d Form becomes regularized

Table 6.15 (CHI) Morphosyntactic Development in English (Based on Miller 1981)

Participant	Parent	Spanish		English		Mixing						Class.
		Parent	Child	Parent	Child	Total		Turn		Utterance		
						Parent	Child	Parent	Child	Parent	Child	
CAR	M	95	95	2	3	3	2	3	1	0 ^b	1	1
	F	92	93	3	5	5	2	4	1	1	1	1
ALB	M	65	31	25	65	10	4	9	2	1	2	0
	F	38	12	54	83	8	5	6	2	2	3	0
JOH	M	7	5	81	87	12	8	7	3	5	5	1
	F	95	30	3	55	2	15	1	6	1	9	0
TIN	M	94	90	1	7	5	3	4	1	1	2	1
	F	90	90	5	5	5	5	4	4	1	1	1
SHE	M	86	37	7	51	7	12	4	5	3	7	0
	F	0	0	100	100	0	0	0	0	0	0	1
ANT	M	94	65	1	22	5	13	2	3	3	10	0
	F	0	0	100	100	0	0	0	0	0	0	1

Key: Classification: 0=difference statistically significant; 1=statistically not significant

^a in absolute percentages (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.20 (CHI) Child Code Use in Conversation (by Parent)^a

Participant	Parent	Context	Spanish		English		Mixing					
			Parent	Child	Parent	Child	Total		Turn		Utterance	
							Parent	Child	Parent	Child	Parent	Child
CAR	M	free c. story	97	96	1	2	2	2	2	1	0 ^b	1
			89	91	5	7	6	2	5	2	1	0
	F	free c. story	95	95	2	3	3	2	2	1	1	1
			84	87	8	11	8	2	7	1	1	1
ALB	M	free c. story	75	36	15	59	10	5	10	3	0 ^b	2
			34	18	56	81	10	1	9	0	1	1
	F	free c. story	32	11	61	85	7	4	6	2	1	2
			64	22	25	72	11	6	8	1	3	5
JOH	M	free c. story	7	5	87	91	6	4	4	2	2	2
			8	5	74	83	18	12	10	3	8	9
	F	free c. story	95	32	3	51	2	17	1	8	1	9
			96	24	0 ^b	65	4	11	2	2	2	9
TIN	M	free c. story	93	90	2	7	5	3	4	1	1	2
			96	92	1	5	3	3	3	2	0 ^b	1
	F	free c. story	—	—	—	—	—	—	—	—	—	—
			—	—	—	—	—	—	—	—	—	—
SHE	M	free c. story	87	36	7	53	6	11	3	4	3	7
			85	38	6	49	9	13	5	5	4	8
	F	free c. story	0	0	100	100	0	0	0	0	0	0
			0	0	100	100	0	0	0	0	0	0
ANT	M	free c. story	95	69	0 ^b	18	5	13	1	3	4	10
			93	58	6	29	4	13	2	1	2	12
	F	free c. story	0	0	100	100	0	0	0	0	0	0
			0	0	100	100	0	0	0	0	0	0

Key: Context: free c.=free conversation
story=story reading

— = information not available or insufficient

^a in absolute percentages (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.22 (CHI) Child Code Use in Conversation (by Context) ^a

Participant	Parent	Topic	Spanish		English		Mixing					
			Parent	Child	Parent	Child	Total		Turn		Utterance	
							Parent	Child	Parent	Child	Parent	Child
CAR	M	n/Sp Eng	97	97	1	1	2	2	2	1	0 ^b	1
			78	80	7	12	15	8	12	5	3	3
	F	n/Sp Eng	96	96	2	2	2	2	2	1	0	1
			66	72	15	23	19	5	16	3	3	2
ALB	M	n/Sp Eng	68	32	23	63	9	5	8	3	1	2
			43	25	40	73	17	2	16	1	1	1
	F	n/Sp Eng	40	14	53	81	7	5	6	2	1	3
			13	3	82	94	5	3	5	1	0 ^b	2
JOH	M	n/Sp Eng	8	5	81	86	11	9	6	3	5	6
			3	3	76	94	21	3	18	0 ^b	3	3
	F	n/Sp Eng	95	20	2	62	3	18	1	8	2	10
			89	0	7	86	4	14	4	4	0	10
TIN	M	n/Sp Eng	96	93	1	4	4	3	3	1	1	2
			83	74	5	18	12	8	9	3	3	5
	F	n/Sp Eng	—	—	—	—	—	—	—	—	—	—
			—	—	—	—	—	—	—	—	—	—
SHE	M	n/Sp Eng	87	37	7	51	6	12	4	5	2	7
			86	35	6	54	8	11	3	3	5	8
	F	n/Sp Eng	0	0	100	100	0	0	0	0	0	0
			0	0	100	100	0	0	0	0	0	0
ANT	M	n/Sp Eng	97	72	0 ^b	17	3	11	1	2	2	9
			86	42	3	37	11	21	3	4	8	17
	F	n/Sp Eng	0	0	100	100	0	0	0	0	0	0
			0	0	100	100	0	0	0	0	0	0

Key: Topic: n/Sp=culturally neutral / minority culture
Eng=related to community culture

— = information not available or insufficient

^a in absolute percentages (rounded up to the next unit and to the total of 100)

^b less than 1%

Table 6.23 (CHI) Child Code Use in Conversation (by Topic)^a

PARTICIPANT	PARENT	Turn	Utterance	Total Mixing	Classification
CAR	M	1.1	0.9	2	1
	F	0.9	1.1	2	1
ALB	M	34.3	2.1	36.4	0
	F	22.6	3	25.6	0
JOH	M	2.5	5.5	8	0
	F	65	9	74	0
TIN	M	4.6	2.4	7	1
	F	4	1	5	1
SHE	M	51	7.1	58.1	0
	F	0	0	0	1
ANT	M	25	10	35	0
	F	0	0	0	1

Key: **Classification:** 0=not comparable to other normally developing bilinguals
 1= comparable to other normally developing bilinguals ($\pm 5\%$)
^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 6.24 (CHI) Child Language Mixing in Conversation ^a

VARIABLES			Parent	CAR	ALB	JOH	TIN	SHE	ANT
INDEPENDENT									
Pre-conditions (anecdotal)	Parental Background	Parental Ling. Comp. (Spanish)	M	1	1	0	1	1	1
			F	1	0	1	1	0	0
		Parental Attitudes	M	1	1	0	1	1	1
			F	1	0	1	1	0	0
	Language Exposure	Lang. Exp. Patterns	M	1	1	0	1	1	1
			F	1	0	1	1	0	0
		Time U. Parental Supervision	M	1	1	1	1	1	1
			F	1	0	0	0	0	0
		Lan. Exp. Outside		0	0	0	0	0	0
	Conversat. Data (empirical)	Language Exposure	Parental Lang. Input	M	95%	65%	7%	90%	86%
F				92%	38%	95%	90%	0%	0%
Parental Respon. to Mixing			M	0	0	0	0	0	0
			F	0	0	0	0	—	—
DEPENDENT									
Conversat. Data (empirical)	Linguistic Competence (Spanish)	Grammat.complexity (MLU)		1	0	0	1	0	0
		Lex. Divers. (TTR; VOCD)		1	0	0	1	1	1
		Morphosyntactic Developm.		1	0	0	1	0	0
	Language Use	Child Response to Parental Input	M	95%	31%	5%	94%	37%	65%
			F	92%	12%	30%	90%	0%	0%
		Mixing (Sp. to Eng.)	M	1	0	1	1	0	0
			F	1	0	0	1	1	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Amount of Language Mixing: 0=not comparable to bilingual data; 1=comparable to bilingual data

— = information not available or insufficient

Table 6.25 (CHI) Summary of Classification of Variables (Spanish)

VARIABLES			Parent	CAR	ALB	JOH	TIN	SHE	ANT
INDEPENDENT									
Pre-conditions (anecdotal)	Parental Background	Parental Ling. Comp. (English)	M	1	1	1	1	1	1
			F	1	1	1	1	1	1
		Parental Attitudes	M	1	1	0	1	1	1
			F	1	0	1	1	0	0
	Language Exposure	Lang. Exp. Patterns	M	1	1	0	1	1	1
			F	1	0	1	1	0	0
		Time U. Parental Supervision	M	1	1	1	1	1	1
			F	1	0	0	0	0	0
		English Exposure Outside			0	0	1	1	1
Conversat. Data (empirical)	Language Exposure	Parental Lang. Input (English)	M	2%	25%	81%	1%	7%	1%
			F	3%	54%	3%	5%	100%	100%
		Parental Respon. to Mixing	M	0	0	0	0	0	0
			F	0	0	0	0	—	—
DEPENDENT									
Conversat. Data (empirical)	Linguistic Competence (English)	Grammat. complexity (MLU)		1	1	1	0	1	0
		Lex. Divers. (TTR; VOCD)		1	1	1	0	1	0
		Morphosyntactic Developm.		1	1	1	0	1	1
	Language Use	Child Response to Parental Input (E)	M	3%	65%	87%	7%	51%	22%
			F	5%	83%	55%	5%	100%	100%
		Mixing (Eng. to Sp.)	M	1	1	1	1	1	1
			F	1	1	1	1	1	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (English): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (English): absolute percentage

Amount of Language Mixing: 0=not comparable to bilingual data; 1=comparable to bilingual data

— = information not available or insufficient

Table 6.26 (CHI) Summary of Classification of Variables (English)

6.1.8 Evaluation of Data

Hitherto, this section has presented a descriptive account of the results from the data analyses. These results will be further elucidated in a more explanatory fashion at a later point. Some patterns observed in the data have an impact on the statistical analysis found in 6.2. They will be addressed in the following remarks.

With respect to the child's bilingual competence, all subjects display average levels of English knowledge compared with normally developing monolinguals, except for Tina and Antonio. Tina lived in a Spanish-speaking community until the age of 2;11, prior to the period of data collection. Although she was exposed to the English language on a regular basis, mainly from her father, her level of competence appears to be lower than that of an average monolingual speaker during the first month of data collection. However, the data from this subject were obtained from interactions of conversations held exclusively in Spanish. Supplementary non-audio data obtained from the mother's diary, in addition to results from interviews with daycare providers and my own observations, lead to the conclusion that Tina's linguistic development in English is generally within the normal range during the time of data collection. Likewise, the cause for Antonio's data to exhibit non-normative competence totals is that the data corresponding to ages 3;0 and 3;1 were collected in conversations carried out exclusively in Spanish. Recordings at 2;11, in which the child speaks more English, reveal a standard level of competence in this language. The proximity of the MLU and VOCD scores in 3;0 and 3;1 to standard values, together with interviews with his mother, suggests that Antonio's competence in the English language falls within normative boundaries. In Carla's case, the data from English in conversation is limited to the last months of

recordings. Additional data and personal observation support the view that Carla's competence in English is also consistent with standard norms for monolinguals. The fact that parental audio-tapings for these two subjects contain scarce amounts of English speech is due to the patterns of language use in their homes. The data show that family conversations usually take place in Spanish, which makes the emergence of English interactions rather infrequent.

Overall, although the patterns of language exposure in the home vary from child to child, the level of proficiency in English is comparable across subjects. Since all participants in the study obviously display the appropriate English skills with respect to competence and adequacy of use in conversation, this aspect turns out to be statistically irrelevant in the analysis of the variables. For this reason, information about the competence and use of English in these bilingual children is excluded from the statistical tests, while only the values obtained from the analysis of Spanish-related factors will be further considered in order to determine the degree of bilingualism in the subjects. In contrast, the tables pertaining to the degree of competence in Spanish exhibit uneven results across subjects. In some children, the level of competence is constant through the phases of linguistic development observed, while other children display irregular patterns of Spanish competence at different ages. Whereas all subjects seem to have a command of the English language, this does not appear to be the case with Spanish. Data from Alberto, John, Sheila and Antonio yield results which do not match up to tallies from Spanish monolinguals. Hence, these children cannot be considered as competent active (and relatively balanced) bilinguals. In view of the facts, and considering that these six children are growing up in a monolingual English community, it can be inferred that

although the community language may not be spoken at home in all cases, these subjects are acquiring it within a normative range. On the other hand, the background conditions and the Spanish input these children receive from their parents at home (summarized in the independent variables corresponding to Spanish) seem to be the determining factors in whether they acquire the minority language to the same degree as monolinguals. In order to assess which features are influencing (or predicting) the development of the minority language within a normative range, it is necessary to further test these variables statistically.

The percentages of the child's choice of code in conversation based on context (free conversation or story-telling) and the conversational topic (corresponding to culturally-neutral topics, and those related to the minority culture as opposed to topics linked to the community culture) are computed on a separate basis in the analysis (see tables 6.7, 6.8, 6.22 and 6.23). This method is intended to determine if children are sensitive to the context and topic of conversation in their choice of language. The data show that parents certainly alter their behavior in their selection of language. They exhibit an inclination to use more English in certain contexts, for instance, when telling or reading (English) stories, singing songs from the community culture, and teaching rhymes and numbers in that language. With respect to language choice in conversation, an overall correlation between parents and children can be observed in tables 6.22 and 6.23 across subjects. The fact that children correspond in their selection of language to that of their parents does not necessary imply that children are (as their parents seem to be) sensitive to the conversational context and topic. This only gives proof that the subjects are responsive to their parent's linguistic behavior and match the parental use of

language. The children themselves show minor variation with respect to an increasing use of English in certain contexts and with certain topics in conversation. Only John and Antonio reveal a higher use of English in story telling and in conversational interactions with a topic related to the anglophone culture. Children displaying a higher level of Spanish competence appear neither to use more English than their parents nor to be conditioned by the context and topic of conversation. On the contrary, Carla responds with a slightly higher percentage of Spanish use in story-telling contexts and anglophone culture-related conversational topics than her parents. In conclusion, the independent variables # 7 and 8, Context (or Activity) of Conversation and Topic of Conversation, will be eliminated from the statistical test, since they do not provide compelling empirical evidence that children act differently in their choice of code depending on contextual factors in the conversation. However, this resolution seems to be opposed to the view some authors propose in their work on bilingual acquisition. Studies such as Lanza (1997) claim the importance of the context in conversation. A closer look at her analysis reveals that her notion of context refers to language input, i.e. “*language input as a context for language mixing*” (1997: 248), thus including the notion of monolingual context as opposed to bilingual context, English-only context, etc. The current study understands *context of conversation* in this particular setting as the kind of activity that is carried out at the time speech interactions take place.³¹ To the extent that language input is the linguistic data children are exposed to from their parents at home, the apparent disagreement with Lanza (1997) is unsubstantiated. “Context” is treated as a static variable when considered as the equivalent to “activity carried out during conversation”. Nevertheless, the way in which parental interactions with their children regarding the

³¹ See chapter 5.1 for a detailed description of the independent variables in question.

input language(s) are treated in the analysis corresponds to the understanding of “context” as a dynamic concept as it appears in Lanza (1997). In sum, excluding the mentioned variables in the statistical analysis does not imply that the context and the topic of conversation are regarded as irrelevant. The data reveal that parents do alter their behavior in choosing a language of interaction depending on the conversational context and topic. However, in the manner the current analysis is carried out, it cannot be inferred that children in the process of acquiring two languages simultaneously in the home (from parental input) are behaving as their parents do because they, also, are sensitive to the context (activity) and topic of conversation. Nonetheless, the results from the current data analysis serve as evidence that these children do comply with their parents’ language choice in any conversational context or in any topic, on the condition that they have enough competence in the language.

In sum, this section has presented a detailed tabulation of the results from the data analyses classified first by the individual child and then by comparing the main results across all the subjects. Lastly, I have made some observations on the data that set the limits for the upcoming statistical tests.

6.2 Statistical Analysis

Given the comprehensive results obtained from the analyzed data, the statistical tests can now be carried out in order to reveal which of the independent variables are better predictors of the dependent ones (i.e., which conditioning factors from the parental background and input are more likely to explain the child’s linguistic behavior) with respect to bilingual competence and use in conversation.

For statistical purposes, the variables to be analyzed in this study are broken down into specific categories for parental discrimination, as tables 6.27 and 6.28 illustrate. The independent variables are the predictive factors for the dependent variables. Indexes in the last column correspond to the classification of variables used in the statistical tests.

INDEPENDENT VARIABLES		
ASPECT	VARIABLE	INDEX
Parental Linguistic Competence	Mother's Spanish Competence	X1
	Father's Spanish Competence	X2
Parental Attitudes to Child Bilingualism	Mother's Attitudes	X3
	Father's Attitudes	X4
Language Exposure Patterns in the Home	Mother's Language of Exposure	X5
	Father's Language of Exposure	X6
Time Under Parental Supervision	Mother's Time with Child	X7
	Father's Time with Child	X8
Language Exposure Outside the Home	Spanish Exposure Outside	X9
Parental Language Input in Conversation	Mother's Spanish Input	X10
	Father's Spanish Input	X11
Parental Response to Child Mixing	Mother's Response to Child Mixing	X12
	Father's Response to Child Mixing	X13

Table 6.27 Independent Variables for Statistical Analysis

DEPENDENT VARIABLES		
ASPECT	VARIABLE	INDEX
Child's Bilingual Competence	Grammatical Complexity (MLU)	Y1
	Lexical Variety (VOCD)	Y2
	Morphosyntactic Development	Y3
Language of Response to Input in Conversation	Spanish Use with Mother	Y4
	Spanish Use with Father	Y5
Amount of Mixing of Child Codes in Conversation	Mixing with Mother	Y6
	Mixing with Father	Y7

Table 6.28 Dependent Variables for Statistical Analysis

A time factor is included in the statistical analysis in order to capture more variation in the data and for statistical expediency. The current study is a longitudinal one, in which the participants (both adults and children) may change their behavior over time in choosing a language of conversation. An obvious case is that of Alberto. His mother changes the language of communication with her child at a certain point in time. Alberto's data reveals a correlation with his mother's linguistic conduct in his choice of language, as well as in his level of competence. Three times are given corresponding to different ages in the individual (child), as table 6.29 depicts:

TIME	AGE RANGE
t1	2;0-2;4
t2	2;5-2;9
t3	2;10-3;3

Table 6.29 Time Variation Factor

These three evenly distributed time intervals are selected based on the existing data. Recordings corresponding to the age range in each of the three periods are available for every subject, except for Antonio, since data recordings started at a later point for him. The amount of data for each child and time intervals are asymmetrical. For instance, while Carla's recordings encompass 24 hours, Sheila's last for 2 hours. Moreover, Sheila was recorded more intensively at age 2;2 than at 2;8 or 2;11.³² Nonetheless, the data corresponding to each period across subjects is given the same weight for statistical purposes, in order to simplify the task and obtain broad-spectrum results.

³² See Appendix G for a detailed breakdown of the amount of recorded data.

The statistical analysis is carried out using two different types of tests:³³

- **Logistic regressions** are used for dependent variables Y1, Y2, Y3, Y6 and Y7, since they contain binary responses. The values 1 and 0 correspond to the classification of the variables given in the tables. Y1 (index of grammatical complexity or MLU) is classified into: 1=comparable to monolingual data and 0=not comparable to monolingual data. The same applies to variables Y2 and Y3, related to the subjects' Spanish competence.³⁴ For example, the minimum MLU (morpheme) value achieved at 2;2 by a monolingual Spanish speaker in the literature consulted is 2.54 (see Montes 1987, 1992). Values ranging between 2.00 and 3.00 are considered in the current study within normal limits, allowing age variation (cf. Brown 1973). Results from Carla (2.88), Sheila (2.86), Tina (2.16) and Alberto (2.00) are within this scope, whereas the result from John (1.60) is not.

The logistic regression model describes how the probability of an individual category depends on the values of explanatory (independent) variables. Logistic regressions are implemented with the aim of estimating the probability that 1 will occur. For instance, in the current analysis the probability of having Y1=1 when X2 also equals 1 is a 77.8 %, whereas the probability of having Y2=1 when X10=1 is 75 %.

- **Multiple regressions** are implemented in the analysis of variables Y4 and Y5, since both of these dependent variables are quantitative values measured in percentages. Multiple regression models allow variation in the prediction. For instance, X10 (with a value of .000) proves to be the best predictor of Y4, as shown below. Each time

³³ Appendix I contains an overview of the variables included in the statistical analysis. A comprehensive account of the statistical model results can be found in Appendix J.

³⁴ See chapter 5 and section 6.1 in this chapter for a detailed explanation of the classifications for each variable.

X10 increases by 10%, the average percentage (Y4) increases by 7.24%, whereas if X8 (.024) equals 1, average percentage increases by .305.

A set of analyses was run for each dependent variable. Displayed values are significance levels of Wald tests for logistic regressions and T-stats for multiple regressions. The resulting relationships are tabulated in 6.30 below. Highlighted figures correspond to values for the predictors (independent variables or X) of each dependent variable (Y):

			DEPENDENT VARIABLES							
			ASPECT	Bilingual Competence			Response to Input		Mixing of Codes	
			VARIABLE	MLU	VOCD	Mor-synt	Sp use w/ M	Sp use w/ F	Mix w/ M	Mix w/ F
I N D E P E N D E N T V A R I A B L E S	ASPECT	VARIABLE	INDEX	Y1	Y2	Y3	Y4	Y5	Y6	Y7
	Parental Competence	M's competen	X1	.389	.862	.866	.013	.747	.792	.858
		F's competen	X2	.061	.346	.142	.163	.000	.016	.833
	Parental Attitudes to C. Bilingualism	M's attitudes	X3	.389	.862	.866	.013	.747	.792	.858
		F's attitudes	X4	.061	.346	.142	.163	.000	.016	.833
	L. Exposure Patterns in the Home	M's exposure	X5	.389	.862	.866	.013	.747	.792	.858
		F's exposure	X6	.061	.346	.142	.163	.000	.016	.833
	Time Under Parental Supervision	M's time	X7							
		F's time	X8	.871	.871	.866	.024	.038	.114	.898
	Spanish Exposure Outside		X9	.894	.894	.890	.582	.607	.205	.884
	Parental Input in Conversation	M's input	X10	.089	.100	.122	.000	.305	.384	.996
		F's input	X11	.092	.609	.225	.466	.001	.027	.334

Table 6.30 Statistical Test Results

6.3 Interpretation of Results

As previously mentioned, all subjects in the study exhibit competence levels in English equivalent to those in normally developing monolinguals, thus the only variables considered to test bilingual competence correspond to the child's linguistic competence and use in conversation of Spanish, the minority language. Independent variables X12 (mother's response to child mixing) and X13 (father's response to child mixing) show no variation across subjects, and consequently are irrelevant in the statistical test.

The following discussion offers a preliminary interpretation of the statistical analysis in a general, descriptive manner. There is an account for each variable except for one, Y7, which corresponds to the amount of code mixing associated with the father. To begin, three subsections are differentiated according to the aspects tested in the dependent variables: 1) children's bilingual competence (testing their knowledge of Spanish); 2) children's use of language in conversation (testing if Spanish is used appropriately, with respect to interlocutor and context in conversation); and 3) amount of child's code mixing in conversation.

6.3.1 Child Bilingual Competence

The results from the statistical analysis of the variables corresponding to the child's linguistic competence (see 5.2 for details) are interpreted as follows:

Y1=Grammatical Complexity (MLU word/morpheme; MLU_{max})

The best predictors for a 1 to occur in Y1 (acceptable MLU) are X2 (father's competence in Spanish), X4 (father's attitudes to child bilingualism) and X6 (father's language of use with the child), each with a value of .061. Specifically, the probability of having Y1=1

when $X_2=1$ is 77.8%. However, the amount of language use (input) in conversation for both parents X_{10} (mother) and X_{11} (father) are also significant predictive factors (.089 and .092 respectively).

Y_2 =Lexical Variety (VOCD)

The absolute best predictor for lexical diversity in the child (Y_2) seems to be the amount of Spanish input (or use) from the mother (X_{10}) registered in conversation, with a value of .100. This means that the probability of Y_2 to equal 1 when X_{10} is also equivalent to 1 is 75%.

Y_3 =Morphosyntactic Development

X_{10} (amount of Spanish input from the mother) is the best predictor of the Spanish morphosyntactic development in these children, at .122. The Father's background (variables X_2 , X_4 and X_6) is a strong predictor as well, with a value of .142 respectively.

In all but one case, the mothers are the main source of Spanish input for these children. In John's situation, his native English-speaking mother also is a source (although a minor one) of Spanish input. In t_2 (2;5-2;9), the child is exposed to 50% of Spanish with respect to the total of initiating turns uttered by the mother. The fact that mothers use Spanish in the home with their children does not seem to be a sufficient condition for the children's MLU to be within the conventional monolingual range, as the data from Sheila and Antonio reveal. Interestingly, the best manner to predict which of these children will have an MLU within the normal limits is to compare the father's linguistic preconditions and behavior with respect to his use of Spanish in the home. An MLU within a normative range is observed in the data in those cases when the Father is

also using Spanish with the child in the home, and specifically, when the father's linguistic competence and attitudes to child bilingualism are at a significant level. I will return to this point in a more explanatory vein in the next chapter, but the preliminary verdict is that Spanish input from both parents provides better chances for the child to have a normative level of lexical and grammatical complexity. For instance, data from John display an up to standard MLU only in t2 when his mother provides an input of 50% in Spanish (and his father 99%). Alberto exhibits a satisfactory MLU in t1, when his mother provides him with 69% of Spanish input and his father 44%. In t2 and t3, the maternal Spanish input equals 0, although the father maintains a 36% of Spanish in interactions with the child. Results indicate that Alberto's competence in Spanish is below average. Conversely, Sheila has an acceptable MLU in t1 which is not maintained across t2 and t3. On the other hand, Antonio's data suggest that maternal input is sufficient to develop a standard level of lexical diversity, which correlates negatively with John's data during t2. The amount of Spanish input John received at this time from his parents suffices to develop a normative MLU, whereas the Spanish input corresponding to the mother (50%) is not enough for him to develop lexical diversity. Likewise, John's level of morphosyntactic development (Y3) is below the norm, since predictors for this variable are X11 (mother's input) as the main factor (.100) and the father's background circumstances (X2, X4 and X6, with a value of .142). Over time changes in certain subjects provide stronger motivation for using time variation factors in the analysis.

In summary, the most effective predictors of these children's competence in Spanish are the amount of input received from the mothers, as (and if) the primary

sources of exposure to the minority language, together with the Spanish background conditions contributed by the fathers. The fact that the mother commands and uses Spanish in the home with the child is a necessary but not a sufficient condition for the child to speak Spanish as well, or to be competent in that language. Lexical items may be learned based on the mother's Spanish input alone, but in order to develop morphosyntactic complexity, the statistical results indicate a relation between morphosyntax and father, such that the child needs to be exposed to Spanish input from the father as well. Time variation illustrates that these factors can change over time, as exemplified above. Preliminary findings seem to contradict previous studies on bilingual acquisition based on the one person-one language strategy. I will address this issue later in 6.3.4.

6.3.2 Child's Code of Response to Input Language in Conversation

The variables corresponding to the child's selection of code in conversation are divided into amount of Spanish use with the mother (Y4) and with the father (Y5). The multiple regression analyses applied reveal that at .000 the amount of Spanish input coming from the mother (X10) is the best predictor for Y4. Strong predictors with equal value each (.013) include elements from the mother's background, with respect to her competence level in Spanish (X1), attitudes to child bilingualism (X3) and the language of use at home as part of the family exposure patterns (X5). Another solid predictor for child's code selection (at .038) is the amount of time children spend with the father (X8). The more time children spend at home with their fathers alone, the less they will spend with their mothers, which logically corresponds with a lower use of Spanish with the

mothers. Since variable X7 (time children spend under maternal supervision) remains constant across subjects with a 1 classification (i.e. all children in this study spend more than 50% of their waking hours with their mothers), the statistical analysis disregards it, since it does not contribute to predict Y.³⁵

The amount of Spanish that the child uses with the father (Y5) is best predicted by the paternal background (competence, attitudes to child bilingualism and exposure patterns at home, corresponding respectively to independent variables X2, X4 and X6), with equal values of .000, closely followed by the amount of Spanish input received from the father (X11), with a .001 value. The amount of time children spend with their fathers (X8) is also significant (.038). This result can be interpreted as follows: the child will use Spanish with her or his father if the father is a competent speaker of Spanish who uses this language with the child on a regular basis. Besides, the data show that children avoid using Spanish with parents who only speak English to them.

6.3.3 Amount of Mixing of Child Codes in Conversation

Dependent variables Y6 and Y7 stand for the amount of mixed speech the child produces in conversations with the parents. The amount of mixing with the mother (Y6) is best predicted by the circumstances concerning the father (i.e., if the father is a competent speaker of Spanish (X2), approves the child's speaking Spanish in the home (X4), and uses Spanish as the language of interaction with the child (X6)), then it is less likely that the child will mix as much with the mother, and vice versa. Using a stepwise

³⁵ The findings corroborate with Lyon (1996: 205), suggesting that maternal language is the most powerful predictor of the child's language development, as her study on language acquisition in a bilingual community claims. The main reason she gives to support this assumption is that mothers spend more time with small children than fathers. This seems to be also the case in all children in the current study.

regression, the model includes X11 (father's amount of input in Spanish) with a value of .027 as the best predictor of Y6 (mixed speech with the mother), since the mentioned variables related to the father's background are of equal value (.016). In conclusion, the father's linguistic conditions and behavior (as a source of language input) can be demonstrated to influence the child's amount of mixing with the mother. The data show that fathers who are proficient in Spanish are more likely to use this language at home. The more input the subjects receive exclusively in Spanish, the less mixing by the child is observed.

As far as children's code mixing with the father (Y7) is concerned, none of the independent variables emerge as overarching predictors according to the statistical model. The reason for this effect may be the fact that this variable includes both directions of language change, that is, from Spanish into English in conversations carried out in Spanish, and from English into Spanish in English interactions. Children whose fathers speak exclusively English at home (Sheila and Antonio) avoid mixing (into Spanish) with the fathers, for which the children receive a 1 in the classification, meaning that their mixing rates with their fathers are comparable to those of other normally developing bilinguals. Similarly, subjects who mix within normative boundaries with their fathers in Spanish conversations (specifically, Carla and Tina) are also assigned a 1 in the classification. The values given in the statistical analysis are included regardless of directionality of code switch or mix. Correspondingly, there is no logical correlation between, for instance, the father's Spanish competence and the amount of mixing the child exhibits in paternal interactions. The closest value to .000 for Y7 is X11 (.334), corresponding to the father's amount of Spanish use in conversation, but it does not have

sufficient predictive power. A different approach, such as considering only the switch/mix from Spanish into English, may give different results for this variable.

6.3.4 Overall Evaluation of Results from the Statistical Analysis

At first sight, the statistical analysis appears to greatly simplify the results or merely state the obvious. The independent variables X2 (father's competence in Spanish), X4 (father's attitudes to child bilingualism) and X6 (father's language of use with the child), exhibit the same value across the analysis (for instance, .061 for Y1, .142 for Y3, .000 for Y5 and .016 for Y6), producing a correlation between them. It would be possible to combine these variables into one general factor, such as Father's Background. The same occurs with variables X1 (mother's competence in Spanish), X3 (mother's attitudes to child bilingualism) and X5 (mother's language of use with the child), corresponding to Mother's Background. Less transparent may be the fact that the mother's use of Spanish in the home with the child does not seem to be a sufficient condition for the child to speak Spanish. As the data also reveal, the father's knowledge of Spanish is the main predictive factor for the MLU to be within the normal range in these children. This idea seems to somewhat contradict findings from studies analyzing child speech in a one person-one language setting, although not completely. For instance, Döpke, in her study on this particular type of bilingual acquisition, points out that in that specific environment "the relative child centredness of the minority language-speaking parent and his/her skillfulness in actively involving the children in conversational exchanges is related to the degree of bilingualism achieved" (1992: 179). Three out of her five subjects do not produce in the minority language (German). Moreover, this author

reports from the literature (Arnberg 1981 among others) that the majority of families using the one person-one language approach in monolingual Western communities experience resistance on the part of their children to speak the minority language, and that the rate of success for the children to produce speech in the non-community language is very reduced (1992: 19-21). In brief, evidence from the current study questions the success rate of children exposed to a minority language (without community support) exclusively from one parent with respect to their competence as active bilinguals, and hence, their adequate selection of code in conversation.

The fact that lexical items from the minority language appear to be learned from exposure to Spanish from the mother by herself, but that input from both parents is needed for morphosyntactic complexity to experience normative growth, suggests that linguistic modules in the mind of language learners are autonomous and that they develop under different conditions, such as input situation. Over time variation across the various competence aspects (morphology, syntax and the lexicon) examined in some subjects in the analysis is also an indication that modules possess their own timing of development. This input-motivated evidence renders empirical support to the modular interpretation of linguistic representation proposed in chapter 3.

Data limitations are evident in this study. A total of 6 subjects is a low number for a statistical analysis of this kind. A much larger pool of participants is needed in order to obtain a very accurate analysis with more reliable predictors, but for reasons of subject availability and other constraints this was beyond the scope of the current study. Similarly, although there are unequal amounts of data for each section, it is possible to obtain some reasonable insights from the data as it stands.

In conclusion, the statistical analysis reveals a detailed set of independent variables as constant predictors over time for the dependent variables. Such a statistical testing, as opposed to using raw data, explains the relationships between the variables and allows for time variation in a longitudinal analysis. The results tentatively suggest that the most powerful predictors of the dependent variables are the amount of (Spanish) input children receive from their mothers, followed by the fact that the fathers know Spanish and speak it with their children. Both conditions appear to be the strongest factors that influence children's competence and use of the minority language (Spanish) in the home in the middle of a monolingual community. All subjects in the current study who display over time normative levels of Spanish competence and adequate use in conversation receive at least 90% of input in this language from each parent. Tentatively, these facts suggest that the minority language in a monolingual community may only be developed within the norm if it is the only language of interaction in the home, while the community language is acquired without noticeable input from the parents.

6.4 Conclusion

In this chapter, bilingual data analysis and statistical testing were presented and evaluated. A set of variables corresponding to parental linguistic background and behavior (input) appear as predictors of child bilingual competence and appropriateness of language use. By comparing the results from the subjects explicitly selected for this study to independent data obtained from a subject in the literature, the next chapter will ascertain if the proposed model and hypotheses can be independently motivated as predictors for the development of other young bilinguals.

CHAPTER 7

MODEL EVALUATION

In the previous chapters, a probabilistic model has been advanced to estimate and predict the degree of bilingualism that a child is likely to achieve depending on his background conditions. This model consists of both a theoretical explanation of bilingual knowledge representation and a working tool to predict the degree of bilingual development by assessing competence and performance aspects in speech. The current chapter evaluates the proposed model and tests its validity. Section 7.1 summarizes the relationships between the independent and the dependent variables considered in the analysis, as expounded in chapter 6. These relationships set the basis for the analysis of bilingual data from children acquiring two languages in the home in a monolingual community and determine the structure of the predicting instrument. In 7.2, independent published data from a bilingual child (M), acquiring Spanish and English under similar conditions, are analyzed and compared to the data from the subjects in the current study. Further, predictions are made concerning the degree of bilingualism M may have achieved during the time of data collection, based on the variables considered. Finally, these results are evaluated to determine the extent of the current tool's predictive power. Section 7.3 recapitulates the major stances of the proposed model and summarizes the results from the analysis implemented on the empirical data included in the current study.

7.1 Relationships among variables

The results from the statistical analysis of the data from six children regularly exposed to Spanish and English in the home yield a series of predictive factors that

influence the degree of *bilinguality* (cf. Hamers 1981) (i.e., availability of two codes in the subjects, with respect to their linguistic competence and appropriateness of language use in conversation). These factors predict whether the level of bilingual competence in a very young child, simultaneously acquiring two languages in the explored environment, falls within the normal (observed) range, when weighed against other bilinguals with dual exposure (from parents and community) and monolinguals (for each language separately). Figure 7.1 summarizes the relationships between the dependent variables that are being predicted (concerning the level of competence and appropriate language use in conversation) and those independent variables (related to setting or background circumstances) with predictive power according to the statistical analysis.

FOCUS	ASPECT	SETTING	
Bilingual Competence	MLU	Father's background	Mother's input
		Mother's input	
		Father's input	
	VOCD	Mother's input	Father's background
	Morphosyntactic Development	Mother's input	Father's input
		Father's background	
		Father's input	
Bilingual Use	Language of Response to Input in Conversation	Parental input (Mother's & Father's)	
		Parental background (Mother's & Father's)	
		Father's time with child	
	Amount of Mixing of Child Codes in Conversation	Father's background	
		Father's input	

Table 7.1 Overview of Relationships Among Variables

Summarizing this table, as previously mentioned, there is a grouping of three features: the mother's or father's competence, their attitudes to their child's bilingualism

and the pattern of language exposure in the home (i.e. which language a parent claims to speak with the child at home) under one single category. This category is called “Mother’s Background” and “Father’s Background” respectively, given that there is no variation. The aspect labeled “Parental background” refers to both the Mother’s and the Father’s background information, and it can be also grouped as such if there is no variation between the maternal and the paternal circumstances.

According to the results interpreted from the statistical analysis, in general terms the main elements that are significant for making predictions about a very young speaker (exposed to two languages simultaneously in the home in a monolingual environment) are listed in order of relevance (i.e., predictive power) in table 7.2:

Rank Order	Predictor
1	Parental input
2	Parental background
3	Parental time with child

Table 7.2 Summary of Predictors of Bilingual Development

In order to further substantiate the findings from the analysis carried out in the current work, I will compare independent data from a child (M) growing up under similar circumstances to the participants of this study, that is, exposed to English and Spanish in the home in a non-supportive monolingual community. The next section contains the tabulated results from the analysis of M’s data based on the variable relationships displayed in table 7.1 and the predictions made about M’s level of bilingual competence and appropriateness of language use.

7.2 Analysis of M's data

In considering independent data (from other studies) collected by different researchers under similar circumstances (i.e., recordings from very young children exposed to parental input from a minority language in the home without community support), the validity of the current analysis may be further demonstrated. This section examines empirical and anecdotal data from a bilingual child, M, between the ages of 2;0 and 2;6, exposed to English and Spanish in a familial environment in England, and whose mother is working in academia. The data for the present analysis was obtained from Deuchar & Quay (1992, 2000) and Deuchar (personal communication).³⁶

M's data is analyzed following identical procedures as those employed in the examination of data from the six children in this study. As a first step, I will analyze the independent variables and make predictions as to how the dependent variables should look; that is, the degree of bilingualism M may be assumed to possess based on the results from the independent variables. Close attention will be paid to M's knowledge and appropriateness of use in the English language. If M's competence and performance in English proves to be within the established norms, the analysis will proceed as for the six subjects in the base study, and only the variables related to the minority language, Spanish, will subsequently be considered as predictors of M's bilinguality. Tables 7.1 (M) to 7.9b (M) encompass results from the independent variables.³⁷ Variables # 7 (Parental Language Use in Conversation by Context) and # 8 (Parental Language Use in Conversation by Conversational Topic) are not included in the analysis for reasons

³⁶ The transcripts with conversational data are available in the CHILDES databank (URL <http://childes.psy.cmu.edu>).

³⁷ Table numbers are assigned to match those in chapter 6 containing data from the subjects in the current study. Tables registering M's data are numbered 7.1 (M) to 7.26 (M).

already mentioned (see chapter 6 section 1.8). Independent variable 9 (Parental Response to Child's Mixing) was constant in the data across the current study's subjects, and therefore excluded from the statistical tests. Likewise, statistical variable X7 (amount of time under maternal supervision) was eliminated in the regressions for the same reason. However, both variables are tabulated for M's data for comparison purposes. If these variables in M's data remain constant with respect to the subjects' results, they will be further disregarded in the analysis. After presenting the tabulated results from the independent variables, predictions are made separately for competence and performance aspects.

DEPENDENT VARIABLES

Preconditions

Parental background

Parental background classifications (Class.) were listed for statistical computation as binary measures, with Classifications indicating proficiency between 1 and 3 listed as 0, while Classification between 3.5 and 5 was assigned a value of 1.

PARENT	LANGUAGE	Syntax	Phonetics	Lexicon	Average level	Class.
M	E	5	5	5	5	1
	S	4	4	4	4	1
F	E	4	3	4	3.5	1
	S	5	5	5	5	1

Key: Parent: M=Mother; F=Father
Language: E=English; S=Spanish
Level: 5=naive; 4=superior; 3=advanced; 2=intermediate; 1=novice; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 7.1 (M) Parental Linguistic Competence in each Language

As the table shows, M's mother is a native speaker of English and possesses a superior level of proficiency in Spanish. M's father is a native speaker of Spanish and his skills in English are considered advanced to superior. The competence levels from both parents in the two languages are classified as "1" for statistical purposes.

PARENT	Motivation Minority Lang. use	Value of Minority Language	Identification w/ minority culture	Average Level	Class.
M	5	5	3	4	1
F	5	5	5	5	1

Key: Level: 5=very high; 4=high; 3=moderate; 2=low; 1=minimal; 0=insufficient evidence
Classification: 0= 1 - 3 ; 1= 3.5 - 5

Table 7.2 (M) Parental Attitudes to Child Bilingualism

According to the classification in the table, M's parents exhibit positive attitudes to their child's bilingualism. They are motivated to use Spanish with M and value this language very highly. Both parents identify themselves intensely with the minority culture.

Language exposure

PARENT	Native Language	Language with Child	Language with Spouse	Language with Family	Dominant Lang. at Home
M	0	1	1	1	1
F	1	1	1	1	

Key: 0=English; 1=Spanish

^a Language exposure patterns are listed for statistical computation as binary measures. English is listed with the classification 0 while Spanish (as minority language, and thus determiner of bilingual condition) is assigned the classification 1.

Table 7.3 (M) Language Exposure Patterns in the Home ^a

Results from table 7.3 (M) indicate that the dominant home language is Spanish. Both parents use the minority language with their child in dyadic and triadic interactions,

and with each other. The next table displays the amount of time M spends with each parent on a weekly basis.

PARENT	Weekdays ^a	Weekends ^a	Week average ^a	% of Weekly Time	Class.
M	5	10	6	64	1
F	0	10	3	29	0

Key: ^a in number of hours per day

Classification: The amount of time under parental supervision is listed for statistical computation as a binary measure, with classification 0 for the time comprised between 0 and 50% of the total weekly time in which children are awake, and classification 1 for the amount of time between 51 and 100%.

Table 7.4 (M) Time Under Parental Supervision

Based on a daily average of 10 waking hours, M spends 64% of her time with her mother and 29% with her father. The data illustrate that the variable corresponding to the time M spends under her mother's supervision (labeled X7 "Time with Mother" for statistical purposes) is consistent with the results from the other six children ("1"), and therefore, it is not further considered in the analysis for the reasons explained above.

LANGUAGE	# of Weekly Hours	% of Weekly Time	% of Total Time ^a	Class.
E	25	35	100	1
S	0	0	0	0
total	25	35		

Key: ^a Percentage of the absolute time of language exposure outside the home away from the parents

Language: E=English; S=Spanish

Classification: The amount of time children spend away from parents is listed for statistical computation as a binary measure, with Classification 0 for the time comprised between 0 and 50% of the total time of language exposure, and Classification 1 for the amount of time between 51 and 100%.

Table 7.5 (M) Language Exposure Outside the Home

Data results in table 7.5 (M) show that M is not exposed to Spanish outside the home except through parental input (see Deuchar & Quay 2000: 6). Therefore, independent variable # 7, labeled “Language Exposure Outside the Home” (X9 “language outside” in the statistical testing), which refers to the amount of exposure to the minority language away from home, is not a relevant variable with predictive power, according to the results obtained from the statistical analysis. Since M’s exposure to Spanish outside the home is insignificant, this variable is also disregarded as a predictor of M’s bilingual development.

Results from the analysis of conversational data pertaining to the amount of input M’s parents provide her in each language, together with the strategies employed after mixing instances emerge, are presented next.

Conversational data

Language exposure

PARENT	Spanish	English	Mixing		
			Total	Turn	Utterance
M	95	1	4	2	2
F	97	1	2	1	1
average	96	1	3	1	2

Key: ^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 7.6 (M) Parental Language Use in Conversation (by Parent) ^a

Both M’ mother and father use a high amount of Spanish in conversations with their child (95% and 97% respectively). The amount of mixing is slightly higher coming from the mother, and it is steady with respect to turn-internal and utterance mixing.

PARENT	PARENTAL STRATEGIES				
	Minimal Grasp	Expressed Guess	Adult Repetition	Move On strategy	Code-Switching
M	9	11	13	48	19
F	6	0	6	75	13
average	7	6	10	61	16

Key: ^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 7.9a (M) Parental Response to Child's Mixing (by Parent)^a

Parental reaction to M's mixing or inappropriate choice of code seems to be largely that of moving on with the conversation, which suggests that M's parents tend generally to accept the child's inappropriate choice of language, as summarized next.

PARENT	TREND OF PARENTAL STRATEGIES		
	1	0	GENERAL TREND
M	33	67	0
F	12	88	0
average	23	77	0

Key: Trend: 0=acceptance; 1=correction

^a in absolute percentages of strategies (rounded up to the next unit and to the total of 100)

Table 7.9b (M) Parental Response to Child's Mixing (by Trend)^a

Constant variables through subjects are eliminated by the statistical analysis, as is the case of variable X7 (mother's time with her child). Likewise, tables 7.9a (M) and 7.9b (M) indicate that the parental response to M's mixing corresponds to the conduct exhibited by the parents of the children included in the statistical testing, that is, the general trend in all cases is that of accepting the child's mixing behavior. Consequently,

these independent variables (labeled X12 for the mother and X13 for the father) are excluded from the list of predicting factors in the child's acquisition of two languages.

Dependent variables are evaluated next, and following that, predictions are made for each of the dependent variables. A normative level of development in English is expected, based on the evidence from the six subjects in this study.

7.2.1 Prediction of Bilingual Competence

Before making any prediction about the level of Spanish competence in the subject, it is necessary to confirm that M's level of competence in English is within the established norm. The numerical labeling of the dependent variables remains the same for expediency purposes. For this reason, the order of the variables below appears altered with respect to the data outcome presented in chapter 6. Results from the analysis of English utterances are presented next.

INDEPENDENT VARIABLES

Conversational data

English competence

Recording Session Group	Age	MLU		MLUmax		Class.
		morphemes	words	morphemes	words	
1	2;1	3.02	2.82	5.6	5.0	1
2	2;2	2.38*	2.29*	5.0	4.6	1
3	2;5	3.76	3.58	7.8	7.4	1
4	2;6	3.90	3.66	8.6	8.0	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
*Based on less than 50 utterances (20 and up)

Table 7.11 (M) Grammatical Complexity in MLU Classifications (English)

MLU and MLU max scores exhibit normal development compared to results obtained from English-speaking monolinguals in the same age range.

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Class.
1	2;1	67/141	.47	38.39	1
2	2;2	44/101	.43*	21.20*	1
3	2;5	74/185	.40	33.56	1
4	2;6	97/183	.53	67.18	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 * Based on less than 50 utterances (20 and up)

Table 7.13 (M) Lexical Variety in TTR & VOCD Classifications (English)

Likewise, lexical development in English appears to be normative in M's data.

Ling. Stage ^a		1	2	3	4	5	Class.
Age Range		1;4-2;7	1;9-2;11	2;0-3;5	2;4-3;4	3;2-4;5	
S T R U C T U R E	Noun Phrase	(M) + N without VP	(M) + N follows VP	Det + (M) + N	(Det/M) + Adj + N	Same as 4	1
	Age ^b	2;1	2;1	2;2	2;5		
	Verb Phrase	Lone verb	Marked v. '-ing' w/out <i>be</i> or catenative	Pres. Aux <i>can, will, be</i>	Main V and Aux in Past. Past modals	Past <i>be have</i> + -en Aux + NP	1
	Age	2;1	2;1	2;1 ^c /2;5 ^b	2;5	—	
	Negation	<i>no/not</i>	<i>can't/don't</i>	<i>won't</i>	Present <i>be, can, will, do, does</i> . Past <i>did</i>	Past tense and modals Cat + NP <i>be</i> + -ing	1
	Age	2;1	2;1 ^c /2;5 ^b	2;5	2;5	—	
	Yes/No Ques.	Rising intonation	Rising intonation	Rising intonation	<i>Do...?</i> Aux inverted. <i>Be, can, will, do</i>		—
	Age	—	—	—	—		
	Wh- Ques.	<i>what</i> + (<i>this/that</i>) <i>what</i> + (NP) + <i>do</i> + (-ing) <i>where</i> + (NP) + <i>go</i> + (-ing)	<i>what</i> + (N) + V <i>where</i> + (N) + V	Aux without inversion. <i>Why, who, how</i>	<i>Do...?</i> Aux inverted. <i>Be, can, will, do, When...?</i>		1
	Age	2;2	2;2	2;2	2;5		

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 — = no evidence found in the data
^a Linguistic stages according to Brown's labels (1973)
^b Age in which the form appears and/or becomes regularized
^c Form appears only once in the data

Table 7.15 (M) Morphosyntactic Development in English (Based on Miller 1981)

M's age for morphosyntactic development in English is certainly within the average range. On the whole, M's scores for her level of competence in English (the language of the wider community she lives in) correspond to those of a normally-developing child exposed solely to English input. Table 7.17 (M) below sums up the results from the analysis of morphosyntactic complexity and development, as well as lexical variety, in M's English. Table 7.19 (M) groups the results into age blocks. No data is available for t3 (2;10-3;3).

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;1	3.02	2.82	5.6	5.0	.47	38.39	NP (1, 2) ^a ; VP (1, 2); Neg (1)	1
2	2;2	2.38*	2.29*	5.0	4.6	.43*	21.20*	NP (3); Wh-Q. (1, 2, 3)	1
3	2;5	3.76	3.58	7.8	7.4	.40	33.56	NP (4); VP (3, 4); Neg (3, 4); Wh-Q. (4)	1
4	2;6	3.90	3.66	8.6	8.0	.53	67.18		1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
^a Corresponding linguistic stage

Table 7.17 (M) Summary of Linguistic Competence Measurements (English)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0-2;4	2.70	2.55	5.3	4.8	.45	29.79	NP (1,2,3) ^a ; VP (1,2); Neg (1); Wh-. (1,2,3)	1
2;5-2;9	3.83	3.62	8.2	7.7	.46	50.37	NP (4); VP (3, 4); Neg (3, 4); Wh-Q. (4)	1
2;10-3;3	—	—	—	—	—	—	—	—

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
 — = data not available

Table 7.19 (M) Summary of Linguistic Competence Measurements in Age Blocks (English)

From the results shown, the data exhibit a level of English competence within normal limits. This indicates that M's data can be further analyzed with the same procedures applied to the data from the six subjects in the current study. It is predicted that M's Spanish competence will be subject to the independent variables mentioned above. If M's paternal conditions have a value of "1" (Spanish) and parental input in Spanish is at least 90%, a normative Spanish competence (classified as "1") is predicted for M. Table 7.3 presents the tool's predictions for each aspect of the child's bilingual competence, based on the relationships between variables as displayed in table 7.1.

ASPECT	SETTING	M'S CONDITIONS	PREDICTION
MLU	Father's background	1	1
	Mother's input	95%	
	Father's input	97%	
VOCD	Mother's input	95%	1
Morphosyntactic Development	Mother's input	95%	1
	Father's background	1	
	Father's input	97%	

Key: Father's background: 0=English, 1=Spanish

Prediction: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 7.3 Predictions for Bilingual Competence

M's conditions predict a normative Spanish competence. Considering that the tables above give evidence that her English development is within average, the current estimation tool predicts a regular development in M's bilingual competence. Both of her parents are highly proficient in Spanish, have positive attitudes to child bilingualism and provide M with sufficient Spanish input (each parent more than 90%). A correlation

between M's favorable conditions to the development of Spanish and her degree of (bilingual) competence is expected. The following tables, displaying the results from the analysis of M's Spanish proficiency, should verify or refute this hypothesis.

INDEPENDENT VARIABLES

Conversational data

Spanish competence

Recording Session Group	Age	MLU		MLUmax		Class.
		morphemes	words	morphemes	words	
1	2;0	2.02	1.82	6.0	4.0	1
2	2;2	3.66	2.84	7.2	6.0	1
3	2;5	3.64	2.70	10.0	9.0	1
4	2;6	3.44	2.88	11.6	9.8	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 7.10 (M) Grammatical Complexity in MLU Classifications (Spanish)

Results from MLU and MLUmax calculations of the available data range (2;0 to 2;6) show a normative development of M's grammatical complexity in Spanish.

Recording Session Group	Age	Types/Tokens	TTR	VOCD D value	Class.
1	2;0	45/93	.48	32.69	1
2	2;2	68/146	.46	39.77	1
3	2;5	55/140	.39	24.86	1
4	2;6	96/179	.53	81.42	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 7.12 (M) Lexical Variety in TTR & VOCD Classifications (Spanish)

The key finding in this table is that TTR and VOCD scores for Spanish also appear to be within the norm that corresponds to normally-developing monolinguals.

Age Range ^a			2;0	2;1	2;2	2;3	2;4	2;5	2;6	2;7	2;8	2;9	2;10	2;11	3;0	Obs.
S T R U C T U R E	Noun Phrase	N (plural)	X		o											1
		Det + N (pl., fem.)			(X)				X	o						1
		(Det) + N + Adj		o				X								1
	Verb Phrase	Present ind. hab. (sg/pl)	o	o	X											1
		Present ind. continuous			X o		□									1
		Pres. Perfect		o	(X) □				X							1
		Preterit			X o□											1
		Imperfect				o□										0
		Imp. cont.												o		
		Periphrastic future	o		X o		□									1
		Reflexive <i>se</i>			X	o										1
		Impersonal <i>hay</i>	o					X								1
		Imperative Negative		o	(X)				X							1
		Present Subjunctive							o□							1
	Negation	<i>no</i> + V	o		X											1
		<i>no</i> + Adj.	*		X											1
		Subj. + <i>no</i>	o		X											1
		<i>no</i> + V + Obj.			X o											1
		Subj. + <i>no</i> + V + Obj.							*							
	Wh- Ques.	Wh + V	X	o												1
		Wh + V + Obj.	X						o							1

Key: ^a Age in bold corresponds to available data
Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
ind.=indicative
hab.=habitual
X = M
(X) = appears only once in the data
o = Rafael (Hernández Pina 1990)
□ = Maria (Mueller Gathercole, Sebastián and Soto 1999)
◊ = Maria (Fernández 1994)
* = Peru (Meisel 1994b)

Table 7.14 (M) Morphosyntactic Development in Spanish (Adapted from Hernández Pina 1990)

Tallied results illustrate that M's morphosyntactic development is, in the main, along the lines of those subjects selected from the monolingual literature. The next two

tables present a summary in monthly steps and in age blocks (corresponding to t1-t3), respectively, of the results from the measurements applied to test the subject's linguistic competence in Spanish.

Recording Session Group	Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
		morph	words	morph	words			Structure	
1	2;0	2.02	1.82	6.0	4.0	.48	32.69	NP: N (plural); Wh-Ques.	1
2	2;2	3.66	2.84	7.2	6.0	.46	39.77	NP: Pres.ind.hab/cont; Preter.: P. fut: se: Neg.	1
3	2;5	3.64	2.70	10.0	9.0	.39	24.86	hay; NP (Adj.)	1
4	2;6	3.44	2.88	11.6	9.8	.53	81.42	NP (Det.); Pres. Perfect; Imp.neg.	1

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data

Table 7.16 (M) Summary of Linguistic Competence Measurements (Spanish)

Age Range	MLU		MLU _{max}		TTR	VOCD D value	Morphosyntactic Development	Class.
	morph	words	morph	words			Structure	
2;0–2;4	2.84	2.33	6.6	5.0	.47	36.23	NP; VP (Pres, Pret, Fut, se.); Neg.; Wh-Q.	1
2;5–2;9	3.54	2.79	10.8	9.4	.46	53.14	NP; Pres. Perf.; hay; Imperat. neg.	1
2;10–3;3	—	—	—	—	—	—	—	—

Key: Classification: 0=not comparable to monolingual data; 1=comparable to monolingual data
— = data not available

Table 7.18 (M) Summary of Linguistic Competence Measurements in Age Blocks (Spanish)

The results tabulated in 7.10 (M), 7.12 (M), 7.14 (M), 7.16 (M) and 7.18 (M) show that the different aspects of Spanish competence considered in the analysis of M's data (grammatical complexity, lexical variety and morphosyntactic development) correspond to normative values. This confirms the predictions made for M's level of competence in Spanish displayed in table 7.3.

7.2.2 Prediction of Bilingual Use

The current model hypothesizes that linguistic competence correlates with appropriateness of language use as a response to input in conversation. Taking into account that M exhibits bilingual competence (in English and Spanish) within normal boundaries, it can be expected that her use of Spanish and English corresponds to that of her interlocutor, i.e. to parental input. Table 7.4 summarizes the predictions for M's appropriateness of Spanish use with her parents. The percentages provided stand for parental Spanish input.

ASPECT	SETTING		M'S CONDITIONS	PREDICTION
Language of Response to Input in Conversation	Parental input	Mother	95%	1
		Father	97%	
	Parental background	Mother	1	
		Father	1	
	Father's time with child		0	
Amount of Mixing of Child Codes in Conversation	Father's background		1	1
	Father's input		97%	

Key: Parental background / Father's background: 0=English, 1=Spanish
Prediction: 0=not comparable to monolingual data; 1=comparable to monolingual data
Father's time with child: 0=0-50% of total weekly time; 1=51-100%

Table 7.4 Predictions for Bilingual Use

The amount of Spanish input M receives from her mother and father is on average 95% and 97% respectively, and it remains constant over time. As previously mentioned, both of M's parents are competent speakers of Spanish, have positive attitudes to their child's bilingualism, and use the minority language as their language of communication

in the home. The data analyzed from conversations with the parents, together with additional data available from interactions of M with her monolingual English-speaking grandmother, exhibit that M's use of English is appropriate to interlocutor and language of conversation. In view of these facts, the current instrument of prediction anticipates a normative use of both languages in the subject (i.e., availability of language choice). Given M's parental conditions (parental Spanish input of more than 90% and an advantageous parental background for Spanish exposure), it is predicted that the child will reply appropriately to the input language in conversation. The value "1" in the predictions indicates that M will respond to the language of input in interactions with her parents without a (statistically) significant difference. Since both parents in M's case employ the same pattern of exposure at home, i.e., use the same language (Spanish) with their child, the amount of time each parent spends with M is accordingly not relevant. Likewise, the amount of mixing expected in M's speech is within normal range, based on her father's background and amount of Spanish input. Tables 7.20 (M), 7.21 (M), and 7.24 (M) below comprise the results from the analysis of conversational data and show the level of appropriateness in M's responses to her parent's input.

PARENT	Spanish		English		Mixing						Class.
	Parent	Child	Parent	Child	Total		Turn		Utterance		
					Parent	Child	Parent	Child	Parent	Child	
M	95	91	1	4	4	5	2	2	2	3	1
F	97	92	1	4	2	4	1	3	1	1	1
Average	96	92	1	4	3	4	1	2	2	2	1

Key: Classification: 0=difference statistically significant; 1=statistically not significant
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)

Table 7.20 (M) Child Code Use in Conversation (by Parent)^a

The percentage of Spanish turns in M's speech is evidence of her general compliance with her parents' choice of language in conversational interactions. A slightly higher use of English (4% in M versus 1% in her parents) is not statistically relevant in this context. Next table presents a breakdown of percentages of turns according to the age ranges selected in order to observe time variation.

Age Range	Parent	Spanish		English		Mixing						Class.
						Total		Turn		Utterance		
		Parent	Child	Parent	Child	Parent	Child	Parent	Child	Parent	Child	
2;0–2;4	M	92	91	2	6	6	3	2	0 ^c	4	3	1
	F ^b	98	96	()	2	2	2	()	0	2	2	1
2;5–2;9	M	99	93	1	2	()	5	()	3	()	2	1
	F	96	90	2	4	2	5	1	4	1	1	1
2;10–3;3	M	—	—	—	—	—	—	—	—	—	—	—
	F											

Key: Classification: 0=difference statistically significant; 1=statistically not significant
^a in absolute percentages of turns (rounded up to the next unit and to the total of 100)
^b limited amount of data with Father for this period
^c less than 1%
 — = data not available

Table 7.21 (M) Child Code Use in Conversation (in Age Blocks)^a

M seems to maintain her choice of codes in conversation over time, since no significant changes can be observed across age blocks.

PARENT	Turn	Utterance	Total Mixing	Class.
M	3.2	2.8	6.0	1
F	5.4	0.9	6.3	1
average	4.3	1.8	6.1	1

Key: Classification: 0=not comparable to other normally developing bilinguals
 1= comparable to other normally developing bilinguals ($\pm 5\%$)
^a in absolute percentages over total number of turns and utterances (counting the first decimal only)

Table 7.24 (M) Mixing of Child Codes in Conversation^a

As predicted from M's father's background and language use habits with his child (97% of Spanish input on average), M's ratio of mixed speech occurrences (around 6%) stays within the standard values. In sum, results from data analysis exhibit that M's selection of a code in conversation corresponds to the language her parents use. The amount of mixing in M's speech is also comparable to that of normally developing bilinguals. These results are consistent with the predictions made above and entered in table 7.4. A normative level of competence and appropriateness of language use in performance indicates that M has the choice of two codes. Further evidence suggests that Deuchar's subject (M) uses both languages appropriately. One example (2;5) of code-switching (or an "intentional" borrowing) is selected from the data (the switch is underlined):

MOT: qué es eso?
 %eng: what's that
 *CHI: puso ruedas.
 %eng: I put wheels
 *MOT: pusiste qué?
 %eng: you put what
 *CHI: ruedas.
 %pho: l E,: D a h
 %act: holding something in her hands and looking down
 %eng: wheels
 *MOT: lela?
 *CHI: eh no # oh wheel!
 *CHI: puso wheel.
 %eng: I put wheels
 *MOT: ruidos # ruedas?
 %eng: noises, wheels
 *CHI: sí.
 %eng: yes

M resorts to English when her mother does not understand a Spanish word. This switch supports the idea that M has a choice of language. In other occasions, she mixes codes, as in this example from her data collected at 2;6:

***CHI:** un pram un coche.
%pho: o p r a m \$ \$ m, \$ u n k o t S E
%act: pushing the pram
%eng: a pram a car/pram

This alternation of codes (in a Spanish conversation) may be caused by the lack of a Spanish equivalent. The word “coche” may also be translated as “pram” in some varieties of Spanish, which will mean that M does know the equivalent to “pram”. As indicated in chapter 2, it is quite implausible to make a classification of a particular child’s mixing phenomena. In the first case, an intentional switch is clearly visible, whereas in the second example, it is not possible to establish the grounds for the mix.

Next, I discuss how the results from M’s data support the proposed model of analysis, in its aims of predicting if the conditions in a child’s linguistic environment are sufficient for the young speaker to develop both languages simultaneously within a normative range.

7.2.3 Evaluation of Predictions

M’s data were analyzed according to the design for data analysis carried out in this study. Furthermore, the independent variables corresponding to the parental linguistic background and the linguistic environment provided to their child were examined and assessed. A series of predictors were matched against the relevant aspects from the parental setting and the compared results were evaluated. Since M exhibits a normal development of English, only the Spanish data were further considered. The following table summarizes the results of the classification of the variables analyzed from M’s Spanish data.

VARIABLES			Parent	Classification
DEPENDENT				
Preconditions (anecdotal)	Parental Background	Parental Linguistic Competence (Spanish)	M	1
			F	1
		Attitudes to Child Bilingualism	M	1
			F	1
	Language Exposure	Language Exposure Patterns in the Home (dominant language)	M	1
			F	1
		Amount of Time Under Parental Supervision	M	1
			F	1
		Language Exposure Outside the Home (Spanish)		
Conversational Data (empirical)	Language Exposure	Parental Language Input in Conversation (Spanish)	M	95%
			F	97%
		Parental Response to Child's Mixing	M	0
			F	0
INDEPENDENT				
Conversational Data (empirical)	Linguistic Competence (Spanish)	Grammatical Complexity (MLUm/w; MLUmax)		1
		Lexical Diversity (TTR; VOCD)		1
		Morphosyntactic Development (ling. milestones)		1
	Language Use	Language of Response to Input Language in Conversation (Spanish)	M	91%
			F	92%
		Mixing of Child Codes in Conversation (Sp. to Eng.)	M	1
			F	1

Key: Parental Linguistic Competence: 0= 1 - 3; 1= 3.5 - 5.

Parental Attitudes to Child Bilingualism: 0= 1 - 3; 1= 3.5 - 5.

Language Exposure Patterns in the Home: 0=English; 1=Spanish

Amount of Time Under Parental Supervision: 0=0 - 50%; 1=51 - 100%

Language Exposure Outside the Home: 0=0 - 50%; 1=51 - 100%

Parental Language Input in Conversation: absolute percentage of Spanish language use in conversation

Parental Response to Child's Mixing: 0=acceptance; 1=correction

Child's Linguistic Competence (Spanish): 0=not comparable to monolingual data; 1=comparable

Language of Response to Input Language in Conversation (Spanish): absolute percentage

Mixing of Child Codes: 0=not comparable to bilingual data; 1=comparable to bilingual data

Table 7.25 (M) Summary of Classifications of Variables (Spanish)

In view of the results from the analysis of M's Spanish data contained in table 7.25 (M), the current analysis predicted correctly that M would have normal competence in Spanish based on two issues: 1) her English competence is within the norm; and 2) with respect to the minority language, her circumstances are favorably in line with a set of background characteristics (parental linguistic and extralinguistic situation), and language exposure conditions in conversation with her parents. To the extent that M's data were collected in a particular setting (a child between 2;0 and 3;0, growing up exposed to two languages simultaneously at home in a monolingual community without minority language support), this tool predicts correctly what her linguistic development would be like. Moreover, the comparison of results over time (t1 and t2) does not display any variation in M's circumstances, or in her level of competence and linguistic behavior in conversation. M's data exhibit similar results to those obtained from the data of two subjects in the study, Carla and Tina. These three girls receive at least 90% Spanish input from their parents.

Results from additional children with different backgrounds (different parental competence, exposure patterns, parental behavior in conversation, and amount of parental input in the minority language) would also be necessary to validate this model. Unfortunately, to my knowledge data from other children in this age range acquiring simultaneously English and Spanish has not so far been made publicly available to researchers. Other data from different languages can also be applied, although it is necessary to adjust accordingly the norms for assessing the child's grammatical competence (with respect to MLU and morphosyntactic development).

In this section the results from the data analysis of a bilingual child (M) in a setting matching the circumstances of the children in the current study were presented first. Then, the results corresponding to the parental linguistic background and the linguistic environment the child is exposed to were evaluated and applied to predict the child's competence and appropriateness of language choice in conversation with respect to the minority language. All the observed subjects appear to have adequate knowledge of the language of the wider community (English), and to use it appropriately in conversation. In view of this fact, a child who additionally possesses a normative level of development in the minority language, in both aspects of language differentiation (competence and performance), will be considered as a balanced bilingual, i.e., a speaker with a choice of two codes. The overall model advanced in this study to analyze and predict bilingualism in very young children is summarized next.

7.3 Model of Analysis and Prediction of Bilingual Development

This section recapitulates the results of the analysis in the current study and overviews the outcome of the proposed model of prediction of *planned* bilingualism.

The postulated model rests on hypothetical constructs along with empirical analyses and testing of evidence from original and independent longitudinal data. A theoretical model of representation of emerging bilingual knowledge in the mind of the speaker was put forward with the aim of explaining how bilingual knowledge is achieved. In a nutshell, the model advises a dynamic modular conception of developing linguistic representation, based on biological universal principles and maturational constraints. Language development is understood as a systematic and principle-ruled specialization of

an existing compartmentalized language faculty. Very young children exposed to (dual) primary linguistic data acquire a series of discrete items within each linguistic module. Thus a “system” in a child becoming bilingual is understood as a particular state in an instantiation during the acquisition process. This maturing dynamic system may experience variation over time depending on external (environmental) circumstances, evidenced in the intermediate representations that identify diverse stages of bilingual development. The empirical evidence considered in the current study supports the notion of a dynamic modular representation of knowledge to the extent that the data analyses carried out show variation (across modules and over time), not only in different subjects but also within an individual. The rate of development of the diverse modules appears to be relatively autonomous. Some subjects exhibit normative growth in one linguistic module (for instance, the lexicon) at one point in time in the development, while the state of another module (morphosyntax) is not comparable to a monolingual at an equivalent age range. These findings seem to contradict existing models of bilingual acquisition postulated in the literature, such as the modularity matching model (Crain & Wexler 1999) or the competition model (MacWhinney 1987).

The statistical analysis implemented reveals that those variables pertaining to aspects of competence are closely linked to performance factors (appropriateness of language use in conversation) and to environmental circumstances. These in turn are related to input conditions (quality and quantity) and the speaker’s sociolinguistic situation (parental background and language of the wider community). This modular account of the representation of emergent linguistic knowledge is a valid characterization of the mental state of the bilingual (and the monolingual) with respect to what s/he knows

at a certain moment in the development and how s/he comes to know it. This ideal conception sheds light on the general problem of language acquisition and learnability in bilinguals (and hence monolinguals). A modular perception of the organization of linguistic knowledge clarifies aspects of both competence and performance.

A tool of analysis and prediction of bilingualism is advanced here in order to support with empirical evidence the theoretical model proposed. More specifically, this is an instrument of assessment that may make general predictions about the degree of bilingualism in a young child exposed to two languages in a family environment. The hypothetical basis elucidated above served as a point of departure in establishing analysis procedures and measurements implemented in explaining and predicting the level of competence in a developing bilingual. At the same time this theoretical base may explain how this knowledge is put into operation in performance, and how both aspects of language differentiation are interconnected. A series of variables representing aspects of competence and performance were introduced and statistically tested in order to design an objective tool for bilingual measurement and prediction. The proposed instrument of bilingual prediction suggests that the environmental circumstances of the bilingual speaker determine the degree of development with respect to acquisition and implementation of linguistic knowledge adequately. Input received from the wider community appears to be sufficient for a speaker to have a normative command over the language of the community (with respect to competence and language use), at least in the context of bilingual development in a planned familial situation without societal support. With respect to the minority language spoken in the home, a series of conditions need to occur for the child to achieve a normative level of knowledge and appropriateness of use.

Table 7.5 overviews the predicting factors which determine the degree of adequacy in competence and performance. The values of the predictors indicated in the categorization are given as a point of reference in order to assess, according to the data analyzed, to what extent a particular predicting factor will contribute to a normative development of the minority language and, accordingly, of bilinguality. This takes into consideration the fact that the current study reveals that bilingual development (in planned bilingualism in very young children) is a combination of input received from the community and from family members in the home.

ASPECT		PREDICTORS		VALUE
Competence (linguistic knowledge)	MLU	Father's background		1
		Mother's input		90% & up
		Father's input		90% & up
	VOCD	Mother's input		90% & up
	Morphosyntactic Development	Mother's input		90% & up
		Father's background		1
		Father's input		90% & up
Performance (in conversation)	Appropriateness of Response to Input in Conversation	Parental input	Mother	90% & up
			Father	90% & up
		Parental background	Mother	1
			Father	1
		Father's time with child		if F=1, + if F=0, -
	Amount of Mixing of Child Codes in Conversation	Father's background		1
		Father's input		90% & up

Key: Father's background / Parental background: 0=English, 1=Spanish
Parental input: absolute percentage of Spanish language use in conversation
Father's time with child: if Father's background=1 (Spanish), then more time has a higher value
if Father's background=0 (English), then less time has a higher value

Table 7.5 Predictors of Child Bilingualism

Competence measurements include three different modules of linguistic knowledge corresponding to aspects of: 1) morphology and syntax: grammatical complexity (measured in MLU) and development of morphosyntactic structures (based on individual scales for each language); and 2) lexicon (VOCB values). Performance instances are assessed according to two elements: 1) appropriateness of response to input in conversation, i.e., whether the child complies with the parental choice of language; and 2) amount of mixing of codes in conversation.

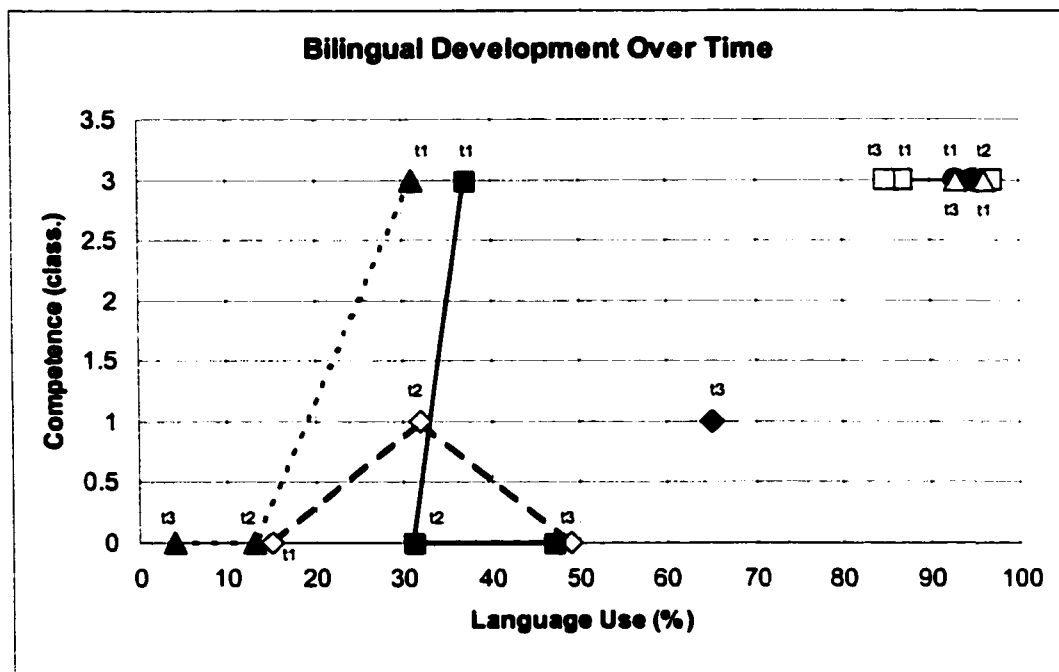
The predicting factors corresponding to each predicted aspect are essentially related to the amount of input in the minority language parents (as main providers) supply to their child, and to the background conditions (such as linguistic competence and attitudes to bilingualism). Analysis procedures can be simplified by reducing the examination of English competence to general observations, since the model predicts that children growing up in a monolingual community without minority language support will command and appropriately use the majority language, regardless of the amount of input from the community language they receive in the home.

A summary of the results of the data analysis implemented in the current study is presented next, in order to illustrate how the children in the current study develop as bilinguals. Figure 7.1 below displays the assessment of the level of bilingual development in the seven subjects considered (that is, the results from six sets of original data and one from independent data). Fundamental measurements of both aspects of language differentiation (competence and performance) interact in the diagram to indicate the degree of bilingual development in each subject. The values charted correspond to the level of competence and appropriateness of language use in the minority language, for the

reasons previously explained. Since all subjects possess a normative level of English (as the societal language), their level of Spanish competence and performance serves to predict their degree of bilingualism. Time variation factors (t1-t3) are included in order to observe the trend of development in the minority language. This charting arrangement concurrently displaying competence and performance measurements allows a prediction to be made of the prospect of a subject's skills in the minority language, and therefore, the dynamic status of bilinguality. Some subjects may be initially considered as balanced bilinguals and over time, due to their changing environmental conditions, they may lag behind in their minority language ability with respect to normative development; and vice versa. A trend in a subject's bilingual development can be envisioned based on the predicting factors mentioned above.

From the standpoint that language knowledge representation is modular, competence tallying is made of a combination of three aspects: grammatical complexity, lexical diversity and morphosyntactic development (measured respectively in MLU, VOCD, and selected morphosyntactic structures). The results from these competence measurements were assigned a classification based on a binary code for statistical purposes, "1" for comparable to normative development and "0" for not comparable (see chapter 5). In order to chart one single competence value, to facilitate visualization of the diagram, the values of the classifications of the three competence measurements are added. The total classification values range between 0 and 3. "3" would correspond to a normative competence development in all the three areas of competence analyzed, and "0" to non-standard development.

The measurement for language use consists of percentages of the highest proportion of Spanish turns in conversations in the minority language with either parent, based on the three age blocks considered (t1-t3). This is done with the aim of providing evidence of the maximum amount of Spanish in conversation a subject has produced in the data recorded. A line denotes the trend of development in those subjects with significant variation over time.³⁸



Key: Competence: Classifications (0=not comparable to normative development – 3=comparable to normative development)
Language Use: in absolute percentages of Spanish turns
t1 (2;0-2;4); t2 (2;5-2;9); t3 (2;10-3;3)
 Δ = Carla
 ▲ = Alberto
 ■ = John
 □ = Tina
 ◇ = Sheila
 ◆ = Antonio (t3)
 ● = M (t1, t2)

Figure 7.1 Bilingual Development Over Time

³⁸ The distinction between continuous and dotted lines is made solely to facilitate reading. Competence classifications are subdivided in .5 units to assist in the graphic display, without further relevance.

The chart presents in the upper right corner the results from three subjects with normative development (Carla, Tina and M). Their data classifications coincide, and thus they are partly overlapped in their display. Results from the other subjects are scattered. Data from Alberto presents a case of (minority) language attrition (at least with respect to production), which correlates with the overtime decreasing amount of Spanish input provided by his mother. John's data show a slight increase in his appropriate use of Spanish over time (still under normative conditions), but the competence values do not reach the standard level in t2-t3. Sheila's data presents a similar pattern of increasing in appropriate language use, without a significant change in the competence classification. Since data from Antonio is available only for the period 2;10 to 3;3 (t3), no time variation can be observed.

This section has reviewed the explanatory model proposed in order to assess and predict the degree of bilingualism in a child under particular circumstances. After recapitulating theoretical and methodological assumptions implied in the current testable model of analysis, I provided an overview of the results from the data analysis showing the status over time of the bilingual development in the subjects in the current study. Competence and performance (language use) measurements are charted simultaneously to provide a general picture of bilingual development in each child.

7.4 Conclusion

In the present chapter, I evaluated the proposed model that was formulated to explain bilingual language development and to predict the degree of bilingualism in a

specific target group - children growing up in monolingual communities exposed simultaneously to two languages (the minority language being received solely from parental input). Upon summarizing the relationships among the tested variables which constitute the predicting and predicted factors, independent data from a child in the literature (M) was analyzed following the same procedures employed in the data analysis of the six subjects in the current study. This allowed further empirical testing of the model, which in turn increased its validity. M's data exhibits that, at the time of data recording, she had a command over the community language (English), and she received more than 90% of Spanish input from each of her parents. After applying the resultant inventory of predictors from the statistical analysis to M's data, predictions were made and verified. M's level of competence in the minority language, as well as the appropriate use of Spanish in conversation were predicted correctly. Finally, the main claims of the current model were reviewed and the results of the analysis of bilingual speech in the subjects summarized. The proposed modular interpretation of bilingual (and monolingual) representation finds empirical substantiation in the data analysis. Input conditions appear to have an impact on the separate aspects of language knowledge studied here (lexicon, morphology and syntax). Linguistic modules seem to develop depending on different input factors, which suggests, in spite of their gradual interconnectivity, an autonomous modular development. Moreover, overtime variation in a particular speaker exhibiting different "bilingual" states (i.e. diverse instantiations in performance exposing various degrees of language knowledge and availability) across modules implies a modular dynamic development, each according to its own timing, depending on input conditions. To the extent that the condition of each module can vary

over time, a maturational approach to language acquisition is sustained. The theoretical base of the model and the practical tool of analysis and prediction of bilingualism provide reciprocal support.

Even if independent data from one child (M) has been tested and correctly predicted, the current model as an instrument of bilingual prediction needs further empirical validation with additional data analyses from subjects with different conditions, with respect to parental background (competence, attitudes and exposure patterns) and parental behavior in conversation (concerning the amount of parental input in the minority language). The current study aims at accumulating evidence towards the goal of reaching conclusive verification with additional upcoming research.

The final chapter next provides a summary of the conclusions and implications drawn on the current model to explain and predict the degree of bilingualism in a very young speaker.

CHAPTER 8

CONCLUSIONS AND THEORETICAL IMPLICATIONS

This chapter recapitulates and discusses the major findings and implications of the current work, evaluating how the goals initially set out are met. A point of departure for future research is also discussed.

8.1 Summary and Discussion of Findings

As mentioned in the introductory chapter, the purpose of this study is to advance a more explanatory model of bilingual development and language choice in the context of very young children exposed to two languages at home in a monolingual community, without minority language support. The investigation has addressed two main aspects: 1) the level of linguistic representation, i.e. the speaker's grammatical competence; and 2) performance, here defined as language use in a manner appropriate to the interlocutor and the context of conversation.

An explanatory model of bilingual development integrating these two aspects of language differentiation was put forward with the aim of providing an instrument to evaluate and predict the degree of bilingual competence and appropriateness of behavior in performance, based on the speaker's linguistic background. The model of bilingual development is presented in two steps: 1) a theoretical account of the mental representation of (bilingual) competence which regards language acquisition as a dynamic modular process visible in performance (supported by evidence from child language acquisition literature); and 2) a tool of assessment which can predict the degree of bilinguality (i.e., availability of language choice) in a subject under the specific

environment conditions described above. In other words, the instrument estimates to what extent a bilingual child exposed to two languages in a family setting can be competent in both languages and is able to use them appropriately in conversation.

The methodology applied to empirically test these assumptions consists of naturalistic data from 6 subjects (aged approximately 2;0 to 3;0) collected longitudinally and analyzed systematically integrating competence and performance elements. The results from the analysis were further compared to another bilingual child's data for verification.

To begin with, a working model of linguistic bilingual representation was proposed with the aim of characterizing the operations involved in bilingual acquisition through a series of developmental linguistic stages. I follow from innate, theoretical principles, such as UG and the Principles and Parameters framework (Chomsky 1986, 1988), as well as language modularity, i.e., linguistic knowledge is considered to be encapsulated in self-contained units (phonology, syntax, morphology, and the lexicon) that operate independently to restrict data flow (Fodor 1983). A modular approach to bilingual language development is applicable to both aspects of language differentiation: competence, as the underlying representation of knowledge, and performance, as the development of modules in actual language use. It is claimed that linguistic representations in very young children are not equal to those steady state capacities of adults. Children undergo a process of acquiring a sequence of discrete items within each linguistic module before they arrive at an adult language status with fully-efficient linguistic system(s). Consequently, language development is identified with a systematic and principle-ruled specialization of an existing compartmentalized language faculty.

This conception makes unfounded both the Unitary Language Hypothesis (Volterra & Taeschner 1978) and the Dual System Hypothesis (Padilla & Liebman 1975, De Houwer 1990, and many others). These interpretations do not appear as opposites, but as essentially connected hypotheses. It is suggested that bilingual language representation can be based on a maturing dynamic single system that presents internal characteristics of separateness postulated by the dual system interpretation. It is assumed that the modules develop over time to the extent that linguistic knowledge possesses innately structured elements. The “central” system is ready once an adequate amount of information has been incorporated via operating (intra-and inter-level) interface components for the modules.

Examples selected from the monolingual and bilingual acquisition literature rendered empirical support to this modular account of linguistic representation in the process of bilingual development in very young speakers. These studies demonstrate how each module has its own particular timing of development and interaction. The claim that initial grammars do not originally reveal equal underlying integrated tendencies as those existing in fully-systematized adult grammars is thus sustained. Moreover, bilingual research suggests the presence of a general universal systematized grammar common to all L1 learners (monolinguals or simultaneous bilinguals) in the earliest acquisition periods, thus upholding the notion of linguistic development as a dynamic process. The outcome from the language acquisition process, to be precise, one or more language-specific grammar(s), will depend on the nature of the input (single or dual) the child receives.

Some of the major findings in the present study reveal the significance of input conditions in the development of more than one grammar in very young children under the specific sociolinguistic circumstances described above (family bilingualism in a wider monolingual community). The current work upholds that in order to carry out the investigation of bilingual acquisition it is essential to examine aspects of linguistic knowledge and language use jointly in conversation. The research question builds on both of these aspects (competence and performance) and addresses the issue of to what extent differentiation in the representation of linguistic knowledge is connected to language use. In particular, the question is whether very young children simultaneously exposed to two languages from birth have a choice of code during speech production, and which factors (psycholinguistic or sociolinguistic aspects, or both together) would influence this choice.

The four testable hypotheses formulated in chapter 4 in order to examine the research question are discussed and evaluated next:

The first two assumptions suggest that language choice is available to children if they have normative competence in both languages. In such a case, children will respond appropriately to the input language of their interlocutor(s) and to the context in conversation. The results of the empirical analysis show that only those children who demonstrated proficiency in both the society and the minority languages replied to their parents appropriately in conversational interactions. These children (Carla and Tina from my original study, and M from Deuchar & Quay 1992) correlated in their choice of code with the behavior of their interlocutors. Supposedly, these children identify their parents as bilingual speakers. It could be observed that if in a particular context the interlocutors

(i.e. parents) tended to use more the language less commonly spoken in the home, the children with a normative level of competence in both languages adhered to their parents' choice of language correspondingly. Conversely, those children who did not demonstrate a normative level of competence in the minority language did not comply with parental language selection at all times. Accordingly, it can be argued that they do not possess a choice of codes. Availability of language choice is therefore understood as the normative knowledge of more than one language, together with the ability to use either one separately or both together appropriately (i.e., sensitive to interlocutor and context) in conversation. Lanza (1992) argues that children at an early age (2;0 onwards) are able to discriminate their language use in a context-sensitive manner, according to interlocutor. The results from the current study seem to support this hypothesis, although only in those cases when children are adequately competent in both languages.

Moreover, the degree of linguistic competence along with the appropriateness of code selection in conversation was hypothesized to correlate with language mixing (the alternating use of both languages in one stretch of conversation, with respect to the input received). Mixing phenomena, especially code-mixing, understood as the inappropriate choice of language without a particular function in the conversation (see 2.4.4), were expected to appear more often in the speech of children exhibiting a low degree of grammatical competence, and hence responding inappropriately to the language of the interlocutor, than in those cases when the speaker has a higher command over the grammar of the conversation. In fact, the data analysis shows that children with a normative competence and use in both languages (Carla, Tina and M) comply with the parental language selection and mix codes within an average range, while children with a

lower degree of Spanish competence tend to use significantly more English in the conversation than their bilingual (English/Spanish) interlocutors. Observing mixing phenomena within the utterance and at the turn level, it is clear that children who alternate codes within the turn or across turns more often, also display a higher occurrence of mixing in utterances. However, the difference is not extremely significant. For instance, Carla mixes on average 1% of the total number of each turns and 1% in utterances, while Alberto's data show a mixing rate of more than 28% in turns and 2.5% in utterances. On the other hand, Antonio's mixing rates are 25% in turns and 10% in utterances. Accordingly, mixing at the turn level (generally corresponding to the inappropriate choice of language with respect to parental choices in parent initiated turns) seems to be related to competence issues, while the correlation between mixing at the utterance level and lack of language knowledge seems to be more uncertain. Köppe and Meisel (1995) argue that grammatical development has an impact on the formal properties of mixed speech. Consequently, mixing at a given early age may be an indication that children are not (yet) fully-competent bilinguals (with respect to normal development at their age). In sum, alternating languages within the utterance is observed to be lower in children with normative linguistic ability in both languages, whereas children falling short in their bilingual ability show different rates of utterance mixing (ranging in these subjects between 2.5% in Alberto and 10% in Antonio).

It could be argued that children with a lower degree of competence in the minority language (Spanish) negotiate the language of conversation by intentionally choosing their language of dominance (English), which corresponds to the language of the wider community. A closer look at the data reveals that while this may be the case in some

instances, during the same stretch of conversation these children also display a tendency to respond to their parent's choice of Spanish with simple "sí" or "no" ("yes", "no") answers, when applicable, or by repeating single words or short sentences from parental utterances. While it is rare for all the children to mix Spanish into an English base language, an alternating use of the two languages characterizes the choice of code in family Spanish interactions in those children not exposed to at least 90% of Spanish by both parents. This alternating pattern in the context of the minority language could be motivated (or justified) by the fact that children are aware that their Spanish-speaking parents are bilingual. This would imply that: a) either these subjects cannot comply with their parent's choice of Spanish because they do not have enough competence in this language; or b) these children are trying to negotiate a language of conversation (which would entail that the development of bilingual pragmatic competence does not require, at least at this point, the standard knowledge of two grammars). The focus of the current analysis is to demonstrate a relationship between mixing behavior and the availability of two codes in the child. The question of bilingual pragmatic competence is left open for further research based on the collected data.

De Houwer (1999) argues that the use of mixed utterances is a language choice strategy within socialization patterns rather than a sign of insufficient language skill. The current study reveals that this is a controversial claim to sustain. Although De Houwer's line of reasoning might be correct to a certain extent, those children in the current study who mixed more often than average did not actually possess a normative level of competence in the language of the conversation.

Lanza (1992) claims a correlation between the amount of parental language alternation and children's mixing behavior, stating the need to focus on parental strategies toward child language mixing in the investigation of language socialization and code-switching. With respect to parental reaction toward child mixing, no major differences could be observed across the participant families. All parents in the study tended to accept child mixing, mostly by moving on in the conversation, without much attempt to correct their child's inappropriate choice of code. However, the results show variation in the linguistic behavior across subjects. Those children who do have a choice of language used their available language abilities accordingly, whereas children who do not have a command over two language grammars responded to their parent's use of the minority language significantly less often with the appropriate choice. Meisel (1994a: 436) maintains that code-switching "requires grammatical knowledge as well as a certain amount of experience in using the two languages". Children who comply with their parent's choice of language do not code-mix atypically; moreover, they are able to code-switch. Mixing phenomena from Carla, Tina and M's data could be clearly interpreted as code-switching instances (see example in 7.2.2). Alberto's mother registered in the diary an example of borrowing during an English conversation, employed by Alberto as a code-switching strategy (into Spanish) to clarify an English concept. This phenomenon appeared during t1 (at 2;3), when Alberto displayed a normative competence level in Spanish.

As mentioned above, children in the current study who are addressed by both parents exclusively in Spanish do not display abnormal mixing rates, whereas children exposed to Spanish from one parent alone do alternate codes often. It seems that code-

alternation in children depends on the directionality of the change and on the language in which the conversation takes place. This study shows that the parents of those children who are competent in both languages and whose speech is within a normal range do not tend to code-switch. However, other children whose parents do not alternate languages, for instance Sheila and Antonio, still make the inappropriate choice of code in a significant number of turns and utterances. The fact that differentiates the subjects is that the latter are exposed to Spanish from one parent alone. Sheila and Antonio's parents seem to use consequently Grammont's Principle (one person-one language approach). These subjects appear to mix languages only with the Spanish-speaking parent and only in interactions taking place in the minority language. This observation is related to the fourth hypothesis formulated in the current study, which will be discussed next.

A correlation between input conditions and bilingual competence, as well as input and appropriate language use, was predicted. The amount and quality of exposure to a language was assumed to have a direct influence on the level of competence and the suitability of use for that language. Results show that all subjects, regardless of the patterns of language exposure in their families, are equipped with English knowledge and are capable of using it appropriately in conversation. On the other hand, only those children who receive constant Spanish input (at least 90%) from both parents exhibit normative competence and appropriate use, that is, have a choice of code. This appears to contradict Paradis & Genesee's (1996) claim that the amount of input is not significant for the rate of grammatical development in a bilingual. These findings also question De Houwer's (1990, 1995) restrictive age limit to characterize bilingual children simultaneously acquiring two languages (see 2.2.2 for discussion). Tina received regular

English input (from the community) upon her move to the United States at age 2;11. Her level of English competence was evaluated as normative at approximately 2;1 (see 6.1.8). Hence the concept of Bilingual First Language Acquisition in such defined period (between birth and one month of age) can merely be a way of defining an initial state, but not a condition to last if the input conditions vary. In any case the sensitive period discussed in 2.2.1 seems to be in effect at about 2;0.

A correlation between input factors and mixing types was predicted to result. Lanza (1997) argues that imbalanced language input is an influencing factor resulting in language dominance (evidenced in the type of mixing). Dominance is understood in the current work as a moment in the development of bilingual speech with respect to the relationship of the two codes in the bilingual (see 2.4.3). The subjects do not appear to alternate languages in conversations entirely in English because they have sufficient knowledge of this language. Only those children whose competence in Spanish is below the norm exhibit recurring mixing patterns from Spanish into English in Spanish conversations. With respect to parental mixing behavior, no significant correlation between parental and child language use is manifest. Sheila and Antonio give respectively 40% and 65% of adequate responses to the Spanish input received from their mothers (90% and 95% correspondingly). Their mixing rates are 51% at the turn level and 7% in utterances in Sheila, and 25% (turns) and 10% (utterances) in Antonio. On the other hand, the subjects Alberto and John, whose parents alternated more often in the use of English and Spanish, exhibit similar mixing rates in Spanish interactions. At the turn level, Alberto mixes 34% at t1 (2;0-2;4) with his mother (who provides 69% of Spanish input) and 23% with his father (providing an average 40% of Spanish input), whereas

John mixes in 65% of the turns in Spanish conversations with his father (who provides a 95% of Spanish input). At the utterance level, Alberto maintains a low mixing rate (2% with his mother and 3% with his father) while John displays a higher amount of mixes (5.5% with his mother and 9% with his father). Utterance mixing in Alberto's parents is particularly low (2% in the father and 1% in the mother), but in John's parents is not significantly higher (5% in the mother and 1% in the father).

Overall, the most conclusive evidence with respect to the relationship between input and mixing is, as elucidated above, that children regularly and intensively exposed to the minority language (at least 90%) from both parents exhibit lesser mixing (both at the utterance and at the turn levels) than children receiving a smaller amount of Spanish input.

Based on these hypotheses, the current study reaches further to answer a critical question in the research of bilingual acquisition: how do children come to have a choice of codes, or in other words, which factors facilitate bilingual development. Apparently, children acquire the language of the wider community regardless of the strategy employed in the family to achieve child bilingualism. The subjects in the present study consistently receive linguistic data from speakers other than their parents outside the home.³⁹ As far as the minority language (in a non-supportive monolingual society) is concerned, it may only be developed under normal circumstances and timing in cases when children regularly receive a minimum of 90% of input from both parents. The parental role proves to be essential (in the configuration of planned bilingualism), but

³⁹ The exposure of these children to mass media sources in the home was observed but not evaluated due to difficulty in measuring it. However, this is a factor that can significantly influence language development in a young child.

apparently only for the development of the minority language. Altogether, children provide evidence that they are sensitive in their linguistic behavior to their parents' conduct, to the extent that they are competent in both languages (i.e. have availability of choice). In turn, children's linguistic abilities are dependant on their parent's linguistic performance. This implies that the success rate in balanced child bilingualism basically relies on the quantity and quality of the input received from the minority language.

Additionally, it can be observed in general terms that parental input as well as child bilingual competence and use can change over time, largely depending on parental linguistic behavior with the children. This study shows that alterations in the parents' choice of language with the child have an effect on the competence level and the appropriateness of language use in their children. For example, when Alberto's mother provided less regular Spanish input to her child, his competence level in that language diminished, and the amount of Spanish use (even with the father) was reduced accordingly.

In sum, bilingual language acquisition appears to be a dynamic process in which input conditions play an essential role in the development of normative competence and appropriate use in conversation in both languages. Parental input configuration is proportional to bilingual development in children. Considering that the mothers spend more time with their children in the home, the role of maternal input seems to be a necessary condition, although not a sufficient one, for children to grow as balanced bilinguals. Paternal input in the minority language is also a condition for a normative development in this language, at least in monolingual non-supportive communities. According to these data results, it is projected that minority language input needs to be no

less than 90% from each parent to reach a linguistic development comparable to monolinguals. Maternal input alone seems to be enough to reach adequate lexical diversity, whereas the development of normative grammatical complexity along with the acquisition of morphosyntactic elements can only be achieved when children are exposed to sufficient input from both parents. These findings give support to a dynamic modular approach to bilingual language development in both aspects of language differentiation competence and performance. A child can display different rates of development across modules and over time depending on the diversity of input conditions s/he is exposed to.

Overall, the hypotheses formulated in the current study prove to be correct to a considerable extent. The research findings attest the need to examine both psycholinguistic (competence) and sociolinguistic (performance) factors simultaneously in the investigation of bilingual acquisition.

8.2 Implications for Further Research

The current work introduces a model of representation of emerging linguistic knowledge in children exposed simultaneously to two languages, describing how incoming data is processed and how a state with two grammars is arrived at. The modular characterization of language development proposed opens a novel perspective in the ongoing discussion of the single or dual systems of bilingual representation hypotheses. It renders invalid the question whether the bilingual child begins with one or two systems. Instead, the query becomes at what point in the development is the representation of linguistic knowledge modularly integrated such that language-specific grammars are acquired.

The findings from the tested hypotheses not only offer support to some claims from previous work on simultaneous bilingual acquisition, such as De Houwer (1990), Paradis & Genesee (1996) and Lanza (1997), but also go beyond these studies to modify their weaknesses and present new evidence to the field.

The tool for bilingual prediction put forward in this study integrates both aspects of language differentiation, i.e. competence and performance, and reveals which factors are relevant predictors of normative bilingual development in a child. This conception opens up innovative prospects in the direction of bilingual acquisition research and provides an instrument to estimate bilingual knowledge and appropriateness of bilingual use in very young children exposed to two languages. That is, it can be predicted to what extent will these children will have a choice of language, in line with the norms observed in other subjects at their age, in view of their linguistic background.

In a practical sense, the model of prediction can also provide additional guiding knowledge to parents who plan on or are currently bringing up their children bilingually, especially in a familial environment within a wider monolingual society. Linguistic background conditions can be evaluated and necessary adjustments can be made beforehand to ensure normative simultaneous bilingual development. In addition, this work provides opportunities for educators to reach a better understanding of the linguistic history and background of the children they teach, as well as the circumstances and conditions under which the language acquisition process of the children takes place outside the institution.

The linguistic power exerted by a non-supportive monolingual wider community is noticeable in the data. All subjects displayed standard ability in the societal language.

While no parental English input was required in the home for these children to acquire adequately this language, a minimum of 90% of Spanish input (from the parents) was necessary to develop a normative bilingual ability. Results may change in subjects exposed to other languages and/or in other societies with more support for non-community languages.

Children in the study whose parents appear to use consequently the one person-one language strategy, do not possess a normative knowledge of the minority language. This seems to contradict, to a certain extent, previous studies in the literature (but see discussion in 6.3.4). An additional factor to consider is to what extent the usual parental exposure habits in the home match their linguistic conduct in conversations registered in the recordings. Parents may be more alert to their choice of language with their children during taping sessions, and thus alter their typical behavior (cf. Goodz 1989). Judging from the topics that arose and the kind of spontaneous behavior exhibited by the parents of Carla and Alberto, it can be inferred that these families were not disturbed by the fact that they were being recorded, which cannot be ascertained for the other families. Recordings from these two subjects are much more numerous than from the other children. This indicates a correlation between the frequency of recordings from the participants and parental natural behavior.

Another potential problem with case studies is the manner in which research is generally conducted. Procedures in collecting analyzing and interpreting data may vary significantly across studies and hence produce results that cannot allow data to be compared on equal basis. A way to solve this problem would be to establish and employ universal methodologies specific to the field of language acquisition when possible, or in

any case define with precise detail the concepts and methodologies used in the investigation.

In summary, the current study on simultaneous bilingual language acquisition in very young children formally demonstrate claims that seem transparent, but that to date no other research has addressed in such a systematic and complete way. It is hoped that the model of bilingual development and the tool of bilingual assessment proposed here motivate further research to adopt a more comprehensive and interdisciplinary perspective in the investigation of bilingual acquisition.

APPENDICES

APPENDIX A

Classification of Types of Bilingual Acquisition in Childhood

While the following categorization of the input conditions in the home under which children can acquire two languages is based on Romaine's (1989, 1995) classification, I believe it is a more comprehensive categorization of the different patterns of bilingual exposure that can occur within the family.

Romaine (1989)

	Types of Bilingual Acquisition in Childhood
1	one person - one language
2	non-dominant home language / one language - one environment
3	non-dominant home language without community support
4	double non-dominant home language without community support
5	non-native parents
6	mixed languages

Adapted from Romaine (1989, 1995), my own classification starts with the most natural situation of bilingual acquisition occurring and develops along a continuum (from natural to unnatural setting, as defined in Bhatia & Ritchie 1999) to the most extreme case of planned bilingualism:

	Types of Bilingual Acquisition in Childhood
1	mixed languages (bilingual parents with community support)
2	non-dominant home language without community support
3	double non-dominant home language without community support
4	non-dominant home language
5	one language - one environment
6a	one parent – one language (relative language use)
6b	one parent – one language (absolute language use)
7a	one parent – one language (non-dominant parents' language)
7b	one parent – one language (community parents' language)
8	non-native parents with community support
9	bilingual / non-native parents
10	non-native parents

Overview of bilingual input patterns in a monolingual community

Remarks:

- Parent 1 and parent 2 could be either the mother or the father.
- The languages have been given a number that can be interpreted as follows:
 - 1- Language of community (in this case it is English)
 - 2- Minority language spoken to the child in the home by one or both parents (for this study it is Spanish)
 - 3/4 - Other native language spoken by parents (Arabic, Indonesian, Galician)
- The numbers in parentheses indicate an optional situation. For instance the native language of Parent 1 in type one could be either two languages or the non-dominant one. The resultant input pattern for the child is unaltered.

The order in this classification relates to the possibilities for the children of being exposed to a balanced bilingual input. It begins with the configuration of mixed language input from both parents in the home and finishes with the situation that allows less exposure to the non-dominant language:

Type of bilingual acquisition	Romaine's classification (1989)	Community language	Parent 1 native language	Parent 2 native language	Parents' language of communication	Language spoken to child parent 1- parent 2	Participants in this study
1	6	1 ^a	1/2	1/2 (2)	1/2 (1)	1/2	
2	3	1	2	2	2	2	
3	4	1	2	3	2 (3)	2 - 3	
4	2	1	1	2	2	2	Carla, Tina ^b
5	2	1	1	2	1/2	1/2 ^c	
6a	1	1	1	2	1	1 - 1/2	
6b	1	1	1	2	1/2	1 - 2	
7a	1	1	1	2	2	1 - 2	
7b	1	1	1	2	1	1 - 2	John
8		1	2	3	1	1 - 2	Antonio
9		1	1/2	1 (3)	1	1 - 2	Sheila
10	5	1	1	1	1	1-2 (1-1/2)	Alberto

^a The community can also be bilingual, according to Romaine (1989).

^b In Tina's case the pattern of language acquisition called "non-dominant home language" started when the child was 1;11.

^c Both parents speak language 2 to the child in the home and language 1 outside.

Further comments:

- There are other possible configurations of parental native languages, for instance the language of the family is language 2, while Parent 1 speaks language 3 and Parent 2 speaks language 4 as native languages, which would be different languages than that of the community and the non-dominant language spoken to the child (2). This configuration could in any case be considered as type 4.
- In addition, it is possible to combine one or more types: for instance, type 1 (mixed languages) with type 4 (non-dominant home language).
- It is also important to notice that the configurations indicated here are flexible and that the child can be exposed to more than one type of bilingual acquisition in the home. When the language of the family is the language of the community, the parent who speaks the non-dominant language to their children will speak the community language when the whole family is together.
- In Type 1 it is also possible (not in Romaine 1989) to include the situation when only one of the parents is bilingual and the other parent has a different native language than that of the community, even if the language spoken by the parents is that of the community. The end result is that the child receives mixed input from each parent separately.
- In case of types 2 and 4, one or both parents could be bilingual from birth/childhood or have learned either the community or the non-dominant language as an adult.
- In type 4 it is also possible that one or both parents are bilingual (the non-dominant language and the community language or a third language) but they keep the non-dominant language as language of interaction with each other and with the child.
- All types can be grouped into two basic patterns of language exposure: types 2, 4, and 5 are variations of a 'one language at home' configuration while types 6, 7, 8, 9 and 10 are variations of the 'one parent-one language' approach. Type 1 could be attributed to any of the two general classifications, depending on the pattern followed in a particular speech interaction.

APPENDIX B

Comparison of Case Studies

The following table compares this study to other empirical case studies on bilingual acquisition, published from 1990 onwards. Although many revisions of these works appeared, the data collected remained the same. Only the first date of publication of results has been considered. Several studies based on the same data have been grouped, as well as the age range of the subjects. The language of the community is mentioned in the first place:

Study	Country	Languages	N	Ages	Focus
This study	USA	English/Spanish	6	2;0 - 3;3	bilingual development
De Houwer 1990	Belgium	Dutch/English	1	2;7 - 3;4	morphosyntax
Lanza 1990	Norway	Norwegian/English	2	2;0 - 2;7	mixing
Deuchar 1992; Deuchar & Quay 1992	UK	English/Spanish	1	1;3 - 1;9	phonology, lexicon, morph.
Meisel 1990; Müller 1990; Köppe 1994	Germany	German/French	4	1;0 - 4;0	morphosyntax
Döpke 1992	Australia	English/German	6	2;4-3;2	parental strategies
Nicoladis 1995	Canada	English/French	6	1;4 - 3;1	mixing
Genesee et al. 1995	Canada	English/French	9	1;10 - 2;2	language choice
Schitzer & Krasinski 1994, 1996	USA	English/Spanish	2	1;1 - 4;6	phonology
Mishina 1999	USA	English/Japanese	1	1;10 - 2;2	language choice

APPENDIX C

Form for Data Collection from Bilingual Children (Spanish / English)

INSTRUCTIONS FOR THE PARENTS

1. **Every two weeks tape-record the child for 30 minutes and if possible, under each of the following situations:**
 - a) **30 minutes alone with his mother.**
 - b) **30 minutes alone with his father.**
 - c) **30 minutes with both parents (there can be more people in the room).**
2. **The recordings can take place in familiar situations for the child (for instance, eating, bathing, playing daily routines, story reading). The purpose is to capture what the child says in his normal environment without inhibitions, that is, it is more convenient if the child does not realize that he is being recorded.**
3. **The adult (or adults) who is (or are) with the child should register in the form given which language of reference s/he uses (or they use) with the child - Spanish or English - during the activities that may be carried out. It is important to reproduce the context in which the situation takes place by filling out the form provided with detail after each recording.**

APPENDIX D

Form to Register Contextual Information on the Recording Sessions

CHILD	Age <i>years, months</i>
Date	
Time	
Situation	
Activities	
Place	
Participants	
Language	
Other contextual information	

Sample Form for a Hypothetical Recording Situation

CHILD (C)	Age <i>2 years, 0 months</i>
Date	<i>March 27, 1998</i>
Time	<i>6 - 6:30 pm (30 minutes)</i>
Situation	<i>Having dinner</i>
Activities	<i>Sitting to the table, serving dishes, eating, C gets up, he sits down again</i>
Place	<i>At home, in the dining area</i>
Participants	<i>C, mother, father</i>
Language	<i>English</i>
Other contextual information	<i>Today C spent an hour prior to dinner playing with his father in Spanish with construction blocks. C. calls these 'legos'. Tonight we're having C's favorite dinner (xxx) and discussing xxx (relevant to C's daycare.)</i>

APPENDIX E

Keeping a Diary of a Bilingual Child's Language Development

What to enter

1. Enter new words (Spanish and English) the child is producing. Note the situation in which the child is taught/learns the new word. Note the first time the child uses the new word spontaneously. What is the child's meaning for that word?
2. Enter new grammatical constructions, e.g. how the child expresses possession, negation, question forms, etc.
3. Enter mixed utterances, that is, expressions that include items from both languages:
 - (1) mixing of words, e.g. *baby no quiere*
 - (2) use of word from one language with parts from another, e.g. *moona* ('moon/luna')
 - (3) use of word from one language but sentence pattern from another, e.g. *esto es papis* ('esto es de papi')
4. THE SITUATIONAL CONTEXT
Try to be specific in the description of the context:
 - who is present in the interaction?
 - to whom is the child addressing her/himself?
 - what very specific event prompted the child to talk?
e.g. the child sees and hear a dog bark as opposed to the child's merely hearing the dog bark.
 - what is the topic of conversation: what was being talked about before and after the child's utterance?
 - What very specific need is the child expressing?
e.g. is the child using the word to get someone to do something for her/him or is s/he merely naming something, etc.
5. Accompanying behavior and/or reactions:
 - include pertinent gestures and actions of both the child and her/his interlocutors
 - include information about the child's mood and/or the tone of her/his voice (e.g. expressing impatience, anger, etc.)
6. Note any comments the child makes about her/his own speech and/or the speech of others.
7. Note any specific routines the child engages in (e.g. peek-a-boo).
8. Note any unusual/special events, for example,
 - when the child is with Spanish speakers
 - changes in the child's health
 - father or mother has been out of town.

9. Include any miscellaneous descriptive details/comments which may explain the child's utterances:
- descriptions of prior events necessary to an understanding of the present entry
 - comments about how the present entry relates to another note in the diary with the date so that easy cross-reference is possible
 - 'translations' of child's idiosyncratic language (also the child's linguistic creativity in inventing idiosyncratic forms).

MONTHLY SUMMARY

Enter on birth date of each month a detailed summary of the child's language acquisition during the previous month (new words, expressions, etc.) as well as comments on overall development.

How to enter

1. Enter the date in the margin.
2. Enter what each person does or says on a separate line. An easy way to indicate who is doing what is to use the first initials of names, e.g. F=father, M=mother, C=child.
3. Punctuation
Use the following punctuation marks in the entries:
Full stop: a full pause at the end of an utterance. The utterance need not be a sentence grammatically.
Comma: a slight pause between words but the words are heard as a single utterance.
Question mark: the voice is heard to rise as in a question.
Exclamation mark: the voice sounds excited, urgent or agitated.
4. Enter the child's words as s/he pronounces them, e.g. 'wawa' for 'water'. Give the adult form if it is not apparent.

Example:

1 April 1998 Child is on the backyard playing with her kitten and it scratches her.
C: Stop it, gatito!
Child's (English-speaking) caretaker often uses this expression when talking to the children in her group.

Based on Lanza (1992) and Braunwald & Brislin (1979).

APPENDIX F

CHAT Transcription Symbols

Obligatory Headers

@Begin	marks the beginning of a file
@End	marks the end of the file
@Participants	lists actors in a file

Constant Headers

@Age of XXX	marks a speaker's age
@Birth of XXX	shows date of birth of speaker
@Coder	people doing transcription and coding
@Coding	version of CHAT coding
@Educ of XXX	indicates educational level of speaker
@Filename	shows name of file
@Font	sets the font for the following text
@Group of XXX	indicates the subject's group in group studies
@ID	code for STATFREQ analyses
@Language	the principal language of the transcript
@Language of XXX	language(s) spoken by a given participant
@SES of XXX	indicates socioeconomic status of speaker
@Sex of XXX	indicates gender of speaker
@Stim	indicates stimulus for elicited production
@Transcriber	gives the transcriber's name or initials
@Warning	marks defects in file

Changeable Headers

@Activities	component activities in the situation
@Bg and @Bg	begin gem
@Bck	backgrounding information
@Comment	comments
@Date	date of the interaction
@Eg and @Eg	end gem
@G	simple gems
@Location	geographical location of the interaction
@New Episode	point at which a new episode begins and old one ends
@Room Layout	configuration of furniture in room
@Situation	general atmosphere of the interaction
@Tape Location	footage markers from tape
@Time Duration	beginning and end times
@Time Start	beginning time

Word Symbols

@	special form markers
xxx	unintelligible speech, not treated as a word
xx	unintelligible speech, treated as a word
yyy	unintelligible speech transcribed on %pho line, not treated as a word
yy	unintelligible speech transcribed on %pho line, treated as a word
www	untranscribed material
0	actions without speech
&	phonological fragment
[?]	best guess
()	non-completion of a word
0word	omitted word
0*word	ungrammatical omission
00word	(grammatical) ellipsis

Morpheme Symbols

-	suffix marker
#	prefix marker
+	compound or rote form marker
~	clitic marker
&	fusion marker
-0	omitted affix
-0*	incorrectly omitted affix

Utterance and Tone Unit Terminators

.	period
?	question
!	exclamation
-?	rising final contour
-!	final exclamation contour
-.	falling final contour
-'.	rise-fall final contour
-,"	fall-rise final contour
-,	level non-final contour
-<u>-</u>	falling non-final contour
-,'	rising non-final contour
,	syntactic juncture
"	tag question
#	pause between words
-:	previous word lengthened

Special Terminators and Linkers

+...	trailing off
+..?	trailing off of a question
+/.	interruption
+/?	interruption of a question
+//.	self-interruption
+//?	self-interruption of a question
+"/.	quotation follows on next line
+".	quotation precedes
+"	quoted utterance follows
+^	quick uptake
+<	"lazy" overlap marking
+,	self-completion
++	other-completion
[c]	clause delimiter

Prosody within Words

/	stress
//	accented nucleus
///	contrastive stress
:	lengthened syllable
::	pause between syllables
^	blocking

Scoped Symbols

[=! text]	paralinguistics, prosodics
[!]	stressing
[!!]	contrastive stressing
["]	quotation marks
[= text]	explanation
[: text]	replacement
[0 text]	omission
[:=x text]	translation
[=? text]	alternative transcription
[%xxx: text]	dependent tier on main line
[% text]	comment on main line
[Stext]	code on main tier
[?]	best guess
[>]	overlap follows
[<]	overlap precedes
[<>]	overlap follows and precedes

[>number]	overlap follows and overlaps are enumerated
[<number]	overlap precedes and overlaps are enumerated
[/]	retracing without correction
[//]	retracing with correction
[///]	retracing with reformulation
[-]	false start without retracing
[/?]	unclear retrace type
[*]	error marking
[+ text]	postcode

Dependent Tiers

%act:	actions
%add:	addressee
%alt:	alternative transcription
%cod:	general purpose coding
%com:	comments by investigator
%def:	codes from SALT
%eng:	English translation
%err:	error coding
%exp:	explanation
%fac:	facial actions
%flo:	flowing version
%gls:	target language gloss for unclear utterance
%gpx:	gestural and proxemic activity
%int:	intonation
%lan:	language
%mod:	model or target phonology
%mor:	morphemic semantics
%par:	paralinguistics
%pho:	phonetic transcription
%sit:	situation
%snd:	sonic CHAT sound tier
%spa:	speech act coding
%syn:	syntactic structure notation
%tim:	time stamp coding

Symbols for Coding on Dependent Tiers

/.../	delimiters for phonetic notation
\$	indicates codes
\$=N	occurs for N following utterances
\$sc=N-M	codes refer to words N through M on the main tier
<bef>	occurrence before an utterance

<aft> occurrence after an utterance

Error Coding

\$= source of an error in the %err line
= placed between error and target
; separates errors on %err line

Coding on the %mor Tier

| follows part-of-speech on %mor line
& non-concatenated morpheme on %mor line
+ (plus) compound delimiter on %mor line
- (hyphen) suffix delimiter on %mor line
: feature fusion on %mor line
~ (tilde) clitic delimiter on %mor line
0 precedes omitted element
0* precedes incorrectly omitted element

APPENDIX G

Amount of Recorded Data

CARLA

Birthdate July 5, 1996

Recordings: July 4, 1998 – October 26, 1999

#	Date	Age	Participants	Language	Context	Length	Tape
1	July 4, 1998	2;0;0	F, M	Sp (E)	fc	20'	1
2	July 4	2;0;0	F	Sp (E)	s	20'	
3	July 4	2;0;0	M	Sp	s	12'	
4	July 12	2;0;8	M, I	Sp	fc	15'	2
5	August 13	2;1;9	F / M, F	Sp	s	15'	3
6	August 21	2;1;18	M	Sp	fc	5'	
7	August 22	2;1;19	F	Sp (E)	s	10'	
8	August 26	2;1;23	M, F	Sp (E)	fc/s	10'	
9	August 27	2;1;23	M	Sp (E)	fc/s	50'	
10	August 30	2;1;26	M	Sp	f	30'	
11	September 10	2;2;6	M, F	Sp (E)	f	17'	
12	September 12	2;2;8	M, F	Sp	f	6'	
13	September 13	2;2;9	F	Sp	f	25'	
14	September 14	2;2;10	M, F	Sp	s	30'	4
15	October 1	2;2;27	M	Sp	fc/s	30'	
16	October 2	2;2;28	M	Sp (E)	f	25'	3
17	October 16	2;3;12	M	Sp	f	25'	5
18	October 17	2;3;13	M, F	Sp	f	20'	
19	October 18	2;3;14	F	Sp	f	30'	
20	November 3	2;4	M	Sp	s	20'	6
21	November 4	2;4;1	M, F	Sp	f	25'	
22	November 6	2;4;3	M, F	Sp	f	25'	
23	November 20	2;4;16	M	Sp (E)	s	10'	7
24	November 20	2;4;16	F	Sp	fc/s	20'	
25	November 20	2;4;16	M, F	Sp	fc/s	60'	
26	December 6	2;5	F	Sp	f	20'	8
27	December 6	2;5	M	Sp	f	13'	
28	December 6	2;5	M, F	Sp	f	27'	
29	Jan. 3, 1999	2;5;30	M	Sp	s	5'	9
30	January 3	2;5;30	M, F, V	Sp	f	60'	
31	January 3	2;5;30	F	Sp	s	25'	
32	January 18	2;6;14	M	Sp	f	8'	10
33	January 19	2;6;15	F	Sp	s	20'	

34	January 19	2;6;15	M, F	Sp	fc/s	35'	11
35	February 1	2;6;27	M, F	Sp	s	44'	
36	February 2	2;6;28	M	Sp	fc/s	35'	12
37	February 2	2;6;28	F	Sp	f	15'	
38	February 16	2;7;12	M, F	Sp	fc/s	40'	
39	February 17	2;7;14	F	Sp (E)	fc/s	20'	13
40	February 18	2;7;14	M	Sp	f	25'	
41	February 18	2;7;14	M, F	Sp	fc/s	12'	
42	March 2	2;7;26	M, F	Sp	fc/s	45'	14
43	March 3	2;7;27	M	Sp	fc/s	30'	15
44	March 3	2;7;27	F	Sp	fc/s	25'	
45	March 19	2;8;15	M, F	Sp	f	25'	16
46	March 19	2;8;15	M, F	Sp	fc/s	15'	
					fc/s	17'	14
47	March 25	2;8;21	M, I	Sp	f	5'	16
48	April 7	2;9;3	M, I	Sp	f	8'	17
49	April 26	2;9;22	F, M, I	Sp	f	5'	
					fc/s	28'	
50	May 4	2;9;30	M, F, I	Sp	f	52'	18
51	May 4	2;9;30	F	Sp	s	10'	
52	June 11	2;11;6	M, I	Sp	f	45'	19
53	July 21	3;0;17	M, I, V	Sp	fc/s	45'	
54	September 28	3;2;20	M, I	Sp	fc/s	90'	20
55	October 26	3;3;22	M, I	Sp	f	45'	21

Key: Participants: M=Mother; F=Father; I=investigator; V=visitor
Language: Sp=Spanish; Eng=English
Context: fc=free conversation; s=story reading

ALBERTO

Birthdate: April 15, 1996

Recordings: December 1997- April 21, 1999

#	Date	Age	Participants	Language	Context	Length	Tape
1	December 97	1;8	M / M & F	Eng & Sp	fc/s	13'	2
2	May 8	2;0	M, I	Sp	f	25'	3
3	June 1	2;1	M	Sp/Eng	fc/s	25'	
4	June 4	2;1	M, F, I	Sp/ some Eng	fc/s	65'	4
5	June 23	2;2	F, (M)	Sp/Eng	fc/s	28'	
6	June 25	2;2	M, I, V	Sp	fc/s	47'	5
7	June 30	2;2	M	Sp/some Eng	f	30'	
8	July 12	2;2	F	Eng/some Sp	f	5'	2
9	July 13	2;2	M, F, I	Sp/Eng	f	55'	6
10	August 3	2;3	F	Eng	fc/s	23'	7
11	August 16	2;4	F	Eng	f	5'	
12	August 16	2;4	F, CAR, C's F	Eng	f	12'	
13	August 18	2;4	M, F	Eng	f	18'	
14	August 18	2;4	M	Sp/some Eng	fc/s	21'	6
15	August 18	2;4	M, F	Eng	fc/s	14'	
16	August 19	2;4	M, F, I	Sp/Eng	f	45'	8
17	August 27	2;4	M	Sp/Eng	fc/s	21'	
18	August 27	2;4	M, F	Sp/Eng	s	24'	
19	August 27	2;4	F	Eng/Sp	fc/s	5'	9
20	August 27	2;4	F	Sp/Eng	fc/s	5'	10
21	August 30	2;4	F	Eng/some Sp	f	32'	
22	September 5	2;4	F	Sp/Eng	f	17'	11
23	September 7	2;4	F	Sp/Eng	fc/s	28'	
24	October 27	2;6	F	Eng/Sp	fc/s	19'	12
25	November 1	2;6	F, M	Eng	s	5'	
26	November 7	2;6	M	Eng	s	21'	
27	November 16	2;7	F	Eng/Sp	f	12'	
28	November 19	2;7	F	Eng	f	33'	
29	December 4	2;7	F	Eng /Sp	f	14'	13
30	January 13	2;8	F	Sp/Eng	f	8'	14
31	February 21	2;9	F	Eng/ some Sp	fc/s	23'	
32	February 28	2;9	F	Eng	f	14'	
33	April 21, 99	3;0	F	Eng	fc/s	30'	15

Key: Participants: M=Mother; F=Father; I=investigator; V=visitor
Language: Sp=Spanish; Eng=English
Context: fc=free conversation; s=story reading

JOHN

Birthdate: March 22, 1998

Recordings: April 10, 2000- August 25, 2001

#	Date	Age	Participants	Language	Context	Length	Tape
1	April 10	2;0	M	Eng	fc/s	20'	1
2	April 15	2;0	F	Sp	fc/s	10'	
3	April 15	2;0	M & F	Eng & Sp	fc/s	17'	
4	May 10	2;1	F	Sp	f	12'	
5	May 10	2;1	M & F	Eng & Sp	f	10'	
6	May 10	2;1	M	Eng	s	23'	
7	May	2;2	M	Eng & Sp	fc/s	45'	2
8	June 3	2;2	F	Sp & En	fc/s	6'	3
9	June 12	2;2	M & F	Sp & En	fc/s	26'	
10	June 27	2;3	M &	Eng & Sp	fc/s	13'	
11	July 1	2;3	M & F	Sp & Eng	s	10'	4
12	July 9	2;3	F F & M	Sp & Eng	f	30' 5'	
13	August 26	2;5	F (M)	Sp & Eng	f	35'	
14	March 16	2;11	F & M	Eng & Sp	f	21'	5
15	August 8	3;3	F	Sp	f	30'	6
16	August 25		F	Sp	fc/s	30'	

Key: Participants: M=Mother; F=Father

Language: Sp=Spanish; Eng=English

Context: fc=free conversation; s=story reading

TINA

Birthdate: August 24, 1995

Recordings: Nov. 7, 1997- Aug 19, 1998

#	Date	Age	Participants	Language	Context	Length	Tape
1	7-NOV-1997	2;2	M	Sp	fc	9'	1
2	8-NOV-1997	2;2	M	Sp	fc	10'	
3	10-NOV-1997	2;2	M	Sp	fc/s	41'	
4	24-NOV-1997	2;3	M	Sp	fc/s	18'	2
5	29-NOV-1997	2;3	M	Sp	fc/s	18'	
6	9-JAN-1998	2;4	M	Sp	fc/s	24'	
7	26-JAN-1998	2;5	M	Sp	fc/s	18'	3
8	27-JAN-1998	2;5	M	Sp	fc/s	19'	
9	29-JAN-1998	2;5	M	Sp	fc/s	23'	
10	19-AUG-1998	2;11	M & F	Sp	fc/s	19'	4
11	21-AUG-1998	2;11	M	Sp	fc/s	13'	

SHEILA

Birthdate: November 9, 1995

Recordings: Jan. 10, 1998- Oct. 10, 1998

#	Date	Age	Participants	Language	Context	Length	Tape
1	10-JAN-1998	2;2	M	Sp	fc/s	40'	1
2	21-JAN-1998	2;2	M	Sp	fc/s	45'	
3	AUG-1998	2;8	M (& brothers)	Sp (& Eng)	fc/s	15'	2
4	10-OCT-1998	2;11	M (& brothers)	Sp (& Eng)	fc/s	18'	

Key: Participants: M=Mother; F=Father
Language: Sp=Spanish; Eng=English
Context: fc=free conversation; s=story reading

ANTONIO

Birthdate: July 11, 1995

Recordings: Jun. 24, 1998- Sept. 2, 1998

#	Date	Age	Participant	Language	Context	Length	Tape
1	24-JUN-1998	2;11	M	Spanish (& Eng)	fc	6'	1
2	26-JUN-1998	2;11	M	Sp (& Eng)	s	30'	
3	28-JUN-1998	2;11	M	Sp (& Eng)	fc	25'	
4	8-JUL-1998	2;11	M	Sp (& Eng)	fc/s	10'	2
5	26-JUL-1998	3;0	M	Sp (& Eng)	fc	20'	
6	?-AUG-1998	3;0	F	Eng	s	2'	
7	?-AUG-1998	3;0	M	Sp	fc	8'	
8	2-SEP-1998	3;1	F	Eng	fc	5'	3
9	2-SEP-1998	3;1	M	Sp	fc/s	21'	

Key: Participants: M=Mother; F=Father
Language: Sp=Spanish; Eng=English
Context: fc=free conversation; s=story reading

APPENDIX H

Summary of Linguistic Milestones

SPANISH

(adapted from Hernández-Pina 1990; Fernández 1994; Meisel 1994b; and Mueller Gathercole, Sebastián and Soto 1999)

STRUCTURE		AGE RANGE ^a
Noun Phrase	Noun (plural)	2;2
	Determiner + Noun (plural, feminine)	2;7
	(Determiner) + Noun + Adjective	2;1
Verb Phrase	Present Indicative Habitual (singular/plural)	2;0-2;1
	Present Indicative Continuous	2;2-2;4
	Present Perfect	2;1-2;2
	Preterit	2;2
	Imperfect	2;3
	Imperfect Continuous	2;11
	Periphrastic Future	2;0-2;4
	Reflexive <i>se</i>	2;3
	Impersonal <i>hay</i>	2;0
	Imperative Negative	2;1
	Present Subjunctive	2;6
Negation	<i>no</i> + Verb	2;0
	<i>no</i> + Adjective	2;0
	Subject + <i>no</i>	2;0
	<i>no</i> + Verb + Object	2;2
	Subject + <i>no</i> + Verb + Object	2;6
Wh-Questions	Wh-question + Verb	2;1
	Wh-question + Verb + Object	2;6

^a Ages when structure appears in subjects from the literature.

ENGLISH

(from Miller et al. 1981)

Linguistic Stage	Noun Phrase	Verb Phrase	Negation	Yes/No Quest.	Wh- Questions
1 18-31 months	(M) + N without VP	Lone verb	<i>no/not</i>	Rising intonation	<i>what + (his/that)</i> <i>what + (NP) +</i> <i>do + (-ing)</i> <i>where + (NP) +</i> <i>go + (-ing)</i>
2 21-35 months	(M)+Noun follows VP	Marked verb '-ing' without <i>be</i> or <i>extensive</i>	<i>can't / don't</i>	Rising intonation	<i>what + (N) + V</i> <i>where + (N) + V</i>
3 24-41 months	Det + (M) + N	Present tense Aux <i>can, will, be</i>	<i>won't</i>	Rising intonation	Aux without inversion. <i>Why, who, how</i>
4 28-40 months	(Det/M) + Adj + N	Main V and Aux both in past tense. Past modals: Cat + NP. <i>be + -ing</i>	Present tense <i>be</i> . <i>can, will, do</i> . <i>does</i> . Past tense <i>did</i> .	<i>Do...?</i> Auxis inverted. <i>Be, can, will, do</i> .	<i>Do...?</i> Auxis inverted. <i>Be, can, will, do</i> . <i>When ...?</i>
5 38-63 months	Same as stage 4	Past <i>be</i> <i>have + -en</i> Aux + NP	Past tense Past modals Cat + NP <i>be + -ing</i>		

Noun Phrase Elaboration

Noun Phrase Elaboration

Linguistic Stage	Structure	Description	Examples
1 18-31 months	(M) + N without VP	Noun phrase occurs only without a verb phrase	A coat Mymommy Thatknee More milk
2 21-35 months	(M)+Noun follows VP	Form is same as stage 1, but occurs after a verb or adverb	In that box That a chicken Lookie in the box
3 24-41 months	Det + (M) + N	Determiners include <i>that, this, these, those, a, and the</i> . Modifiers include quantifiers, possessives, and adjectives. The noun phrase may now appear before the verb or verb phrase.	That a blue flower Doggie eat the breakfast A horsie crying This my cup That a dog Horsie stop This yours
4 28-40 months	(Det/M) + Adj + N	Modifier now includes <i>some, something, one, two, other, more, another</i> Noun or pronoun <i>always</i> appears before verb (in subject position) NP most frequently has one element + noun VP contains a NP	I like these toys Put in the eds a one I want some more He hit my truck A horsie run there A boy hit my arm I want another one
5 38-63 months	Same as stage 4	Same as stage 4. Number agreement in subject and predicate continues to be a problem beyond stage 5.	Those my crayon

Verb Phrase Elaboration

Verb Phrase Elaboration

Linguistic Stage	Structure	Description	Examples
1 18-31 months	Lone verb	Main verb unmarked by inflection, except occasionally by -ing. Occasional use of Verb + Adverb (<i>up, on</i>)	Mommy go Baby Sleep Pick up Put on
2 21-35 months	Marked verb "-ing" without <i>be</i> or copulative	Main verb occasionally marked, auxiliary -ing appears, but <i>be</i> is absent. Semi-auxiliaries <i>gonna, gotta, wanna, hafta</i> appear, but are analyzed as single morphemes. Copula appears, but may not have correct tense or number.	I gonna play Wanna go out Where's the puppy?
3 24-41 months	Present tense Aux <i>can, will, be</i>	Main verb now obligatory. Regular past -ed overgeneralization begins. Present tense auxiliaries <i>can, do, and will</i> appear.	Baby eat cookie Why Paul waked up? Suzy will come too I failed that down I is going He can play
4 28-40 months	Main V and Aux both in past tense. Past modals: Cat + NP, <i>be</i> + -ing	Regular past -ed and auxiliary doubly marked for past in negative sentences At least one past modal: <i>could, would, should, must, might</i> . <i>Be</i> + -ing appears.	I didn't spilled it I could eat it We would have two I should go home He must sit down I might like that
5 38-53 months	Past <i>be</i> <i>have</i> + -en Aux + NP	Semi-auxiliary complements now take noun phrase	I wanna play ball

Negation Elaboration

Negation Elaboration

Linguistic Stage	Structure	Description	Examples
1-2 18-34 months	(pro/that) + (NP) (VP) or NP + no	No and not are used to negate the entire sentence.	No night night No milk Not go Daddy no No daddy sit
2-3 24-41 months	can't/don't NP + (Neg) + VP Neg: no, not, can't don't, won't (won't appears late in stage 3)	Negative sentences now include no, not, can't and don't. Can't and don't appear earlier than can and do, and should be analyzed as single morphemes, not as Aux + Neg Negatives appear after the subject and before the predicate	He no bite you He can't play Daddy no byeBye Ginger no kiss Susie no hit You can't do that I won't It won't move
4 28-45 months	Present tense be, can, will, do, does. Past tense did.	Can't and don't now analyzed as Aux + Neg, i.e. as two morphemes "can not" or "do not". Auxiliary elements, contracted or uncontracted, can include: present tense be, can, do, did, does, and will	I'm not going He can't play He is not He can not play I will not play He doesn't have it He does not play ball I don't want it Mary won't kiss him This isn't mine He doesn't sit down They won't play We didn't go out
5 37-52 months	Past tense Past modals Cat + NP be + -ing	Auxiliary elements, contracted or uncontracted, now include past tense be, and past tense modals Past tense contracted be and past tense modals appear infrequently, e.g. wasn't, wouldn't, couldn't, shouldn't	He shouldn't be eating George wasn't home They weren't in school I couldn't fix that toy He wouldn't help me

Yes/No Question Elaboration

Linguistic Stage	Structure	Description	Examples
1-3 18-41 months		Marked only by rising intonation	Mommy see? See hole? No ear? See my doggie? You can't fix it? That block too?
4 28-45 months	Do...? Auxis inverted. Be, can, will, do.	Auxiliary begins to be used, and is appropriately inverted Auxiliary elements include present tense be, can, will, and do. Rising intonation continues to be an alternative form for asking yes/no questions.	Am I silly? It can't be a bigger truck? Can't it be a bigger truck? Do I look like a baby? Is he going too? Will he bring it home? Can I go in the playpen? Can I talk to grandma again? You want to go out? Wanna talk to mama? Want some birthday cake? Wanna see it? Wanna go out?

Wh-Question Elaboration

Linguistic Stage	Structure	Description	Examples
1 18-34 mon	what + (w/what) what + (NP) + do + (-ing) where + (NP) + go + (-ing)	Routine forms of wh- questions only	What this? What that? What you do? What he doing? Where he going? Where daddy going?
Late 2 24-35 mon	what + (N) + V where + (N) + V	Novel wh- questions appear	What getting? What you eat? Where he going? What he do there?
3 24-41 mon	Aux without inversion. Why, who, how	Auxiliary begins to appear but is not inverted Frequent wh- words include what, what-doing, where Infrequent wh- words include why, who, how	Why I can't go? Where the glass of milk is? Who is it? Why you hit me?
Early 4 28-40 mon	Do...? Auxis inverted. Be, can, will, do. When ...?	Appropriately inverted at least once Auxiliary elements include present tense be, can, will, and do When questions appear	Why don't you like stamps on it? When is he going?

APPENDIX I

Summary of Variables for Statistical Testing

Ind	Time	Y1	Y2	Y3	Y4	Y5	Y6	Y7	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13
		MLU	VOCD	m>synt dev	Sp. use w/ M	Sp. use w/ F	Phn w/ M	Phn w/ F	M's compnt	F's compnt	M's attitudes	F's attitudes	M's acceptur	F's acceptur	M's time	F's time	Sp. outside	M's input	F's input	M's resp min	F's resp min
CAR	11	1	1	1	0.95	0.91	1	1	1	1	1	1	1	1	1	1	0	0.95	0.90	0	0
CAR	12	1	1	1	0.96	0.94	1	1	1	1	1	1	1	1	1	1	0	0.97	0.93	0	0
CAR	13	1	1	1	0.93	-	1	1	1	1	1	1	1	1	1	1	0	0.95	-	0	-
ALB	11	1	1	1	0.31	0.18	0	0	1	0	1	0	1	0	1	0	1	0.68	0.44	0	0
ALB	12	0	0	0	0	0.13	1	0	1	0	1	0	1	0	1	0	0	0	0.36	0	0
ALB	13	0	0	0	-	0.04	-	0	1	0	1	0	1	0	1	0	0	0.18	0.36	-	-
JOH	11	0	0	0	0.05	0.15	1	0	0	1	0	1	0	1	1	0	0	0.07	0.94	0	0
JOH	12	1	0	0	0.14	0.32	0	0	0	1	0	1	0	1	1	0	0	0.5	0.99	0	0
JOH	13	0	0	0	0	0.49	1	0	0	1	0	1	0	1	1	0	0	0	0.95	0	0
TIN	11	1	1	1	0.87	0.90	1	1	1	1	1	1	1	1	1	1	0	0.92	0.90	0	-
TIN	12	1	1	1	0.97	0.90	1	1	1	1	1	1	1	1	1	1	0	0.98	0.90	0	-
TIN	13	1	1	1	0.85	0.90	1	1	1	1	1	1	1	1	1	1	0	0.92	0.90	0	-
SHE	11	1	1	1	0.37	-	0	1	1	0	1	0	1	0	1	0	0	0.65	-	0	-
SHE	12	0	0	0	0.31	-	0	1	1	0	1	0	1	0	1	0	0	0.9	-	0	-
SHE	13	0	0	0	0.47	-	0	1	1	0	1	0	1	0	1	0	0	0.96	-	0	-
ANT	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANT	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANT	13	0	1	0	0.65	-	0	1	1	0	1	0	1	0	1	0	0	0.94	-	0	-

APPENDIX J

Results of Statistical Analysis

Predictors for Y1, using a logistic regression

Single Independent Variable Models

Variable	Wald Sig.Level
X1	.389
X2	.061
X3	.389
X4	.061
X5	.389
X6	.061
X8	.871
X9	.894
X10	.089
X11	.092

Stepwise regression would only include X2.
X2 is the best predictor of Y1.

Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
17.910	.222	.298

Classification Table

		Predicted Y1		Percentage Correct	
Observed Y1		.00	1.00		
		5	2		
	.00	2	7		71.4
	1.00				77.8
Overall Percentage					75.0
a The cut value is .500					

Best Model:

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	X2	2.169	1.159	3.504	1	.061	8.750
	Constant	-.916	.837	1.199	1	.273	.400

a Variable(s) entered on step 1: X2.

- Probability($Y1 = 1$, when $X2 = 1$)

$$= \exp(2.169 - 0.916) / (1 + \exp((2.169 - 0.916))) = .778$$

Predictors for Y2, using a logistic regression

Single Independent Variable Models

Variable	Wald Sig.Level
X1	.862
X2	.346
X3	.862
X4	.346
X5	.862
X6	.346
X8	.871
X9	.894
~~X10~~	~~.100~~
X11	.609

X10 is the best predictor of Y2

Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
20.463	.017	.023

Classification Table

Observed Y2	Predicted Y2		Percentage Correct
	.00	1.00	
.00	4	3	57.1
1.00	2	6	75.0
Overall Percentage			66.7

a The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	X10	6.545	3.983	2.700	1	.100	695.673
	Constant	-4.544	3.425	1.760	1	.185	.011

a Variable(s) entered on step 1: X10.

- Probability(Y2 = 1, when X10 = 0) = $\exp(-4.544)/(1+\exp((-4.544))) = .011$
- Probability(Y2 = 1, when X10 = 0.5)
= $\exp(6.545 \times (0.5) - 4.544)/(1+\exp((6.545 \times (0.5) - 4.544))) = .219$
- Probability(Y2 = 1, when X10 = 1)
= $\exp(6.545 \times (1) - 4.544)/(1+\exp((6.545 \times (1) - 4.544))) = .889$

Predictors for Y3, using a logistic regression

Single Independent Variable Models

Variable	Wald Sig.Level
X1	.866
~~X2~~	~~.142~~
X3	.866
~~X4~~	~~.142~~
X5	.866
~~X6~~	~~.142~~
X8	.866
X9	.890
~~X10~~	~~.122~~
X11	.225

Stepwise regression would only include X10 in the model.
X10 is the best predictor of Y3

Model Summary

-2 Log Cox & Snell R likelihood	Nagelkerke R Square
14.633	.334

Classification Table

		Predicted Y3		Percentage Correct
Observed Y3		.00	1.00	
	.00	4	3	57.1
	1.00	1	7	87.5
Overall Percentage				73.3

a The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	X10	5.294	3.420	2.397	1	.122	199.237
	Constant	-3.946	2.988	1.744	1	.187	.019

a Variable(s) entered on step 1: X10.

- Probability(Y3 = 1, when X10 = 0) = $\exp(-3.946)/(1+\exp((-3.946))) = .019$
- Probability(Y3 = 1, when X10 = 0.5)
= $\exp(5.294 \times (0.5) - 3.946)/(1+\exp((5.294 \times (0.5) - 3.946))) = .214$
- Probability(Y3 = 1, when X10 = 1)
= $\exp(5.294 \times (1) - 3.946)/(1+\exp((5.294 \times (1) - 3.946))) = .794$

Predictors for Y4, using a multiple regression

Single Independent Variable Models

Variable	T-stat Sig.Level
~~X1~~	~~.013~~
X2	.163
~~X3~~	~~.013~~
X4	.163
~~X5~~	~~.013~~
X6	.163
~~X8~~	~~.024~~
X9	.582
~~X10~~	~~.000~~
X11	.466

Stepwise regression would include X8 and X10 in the model.
X10 and X8, together, are the best predictors of Y4

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.888	.788	.753	.18853

Predictors: (Constant), X10, X8

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.590	2	.795	22.368	.000
Residual	.427	12	.036		
Total	2.017	14			

Predictors: (Constant), X10, X8
Dependent Variable: Y4

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
(Constant)	-5.062E-02	.107		-.474	.644
X10	.724	.143	.717	5.070	.000
X8	.305	.130	.332	2.349	.037

a. Dependent Variable: Y4

Constant is not significant.

Interpretation: if X8 = 1 average percentage (Y4) increases by .305; for each time X10 increases by 10%, the average percentage (Y4) increases by 7.24%. For example, if X8 = 1 and X10 = .9, then $Y4 = .724x(0.9) + 0.305x(1) = .9566$. You should note that there is a slight overestimation problem with this model, if X8 = 1 and X10 = 1, then $Y4 = 1.029$. This is the limitation of using a linear function to estimate a constrained value.

Predictors for Y5, using a multiple regression

Single Independent Variable Models

Variable	T-stat Sig.Level
X1	.747
~~X2~~	~~.000~~
X3	.747
~~X4~~	~~.000~~
X5	.747
~~X6~~	~~.000~~
~~X8~~	~~.038~~
X9	.607
X10	.305
~~X11~~	~~.001~~

Stepwise regression would include X2 in the model.
X2 is the best predictor of Y5

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.819	.672	.646	.23940
Predictors: (Constant), X2			

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.523	1	1.523	26.576	.000
Residual	.745	13	.057		
Total	2.268	14			
Predictors: (Constant), X2					
Dependent Variable: Y5					

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5.000E-02	.090		.553	.590
X2	.639	.124	.819	5.155	.000
Dependent Variable: Y5					

Constant is not significant.

Interpretation: if X2 = 1 average percentage is .639, otherwise it is 0.

Predictors for Y6, using a logistic regression

Single Independent Variable Models

Variable	Wald Sig.Level
X1	.792
~~X2~~	~~.916~~
X3	.792
~~X4~~	~~.916~~
X5	.792
~~X6~~	~~.916~~
X8	.114
X9	.205
X10	.384
~~X11~~	~~.027~~

Stepwise regression would only include X11 in the model.
X11 is the best predictor of Y6

Model Summary

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
10.628	.455	.611

Classification Table

Observed Y6	Predicted Y6		Percentage Correct
	.00	1.00	
.00	5	1	83.3
1.00	1	7	87.5
Overall Percentage			85.7

a The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	X11	4.884	2.210	4.886	1	.027	132.219
	Constant	-2.563	1.583	2.621	1	.105	.077

a Variable(s) entered on step 1: X11.

- Probability($Y6 = 1$, when $X11 = 0$) = $\exp(-2.563)/(1+\exp((-2.563))) = .072$
- Probability($Y6 = 1$, when $X11 = 0.5$)
= $\exp(4.884 \times (0.5) - 2.563)/(1+\exp((4.884 \times (0.5) - 2.563))) = .470$
- Probability($Y6 = 1$, when $X11 = 1$)
= $\exp(4.884 \times (1) - 2.563)/(1+\exp((4.884 \times (1) - 2.563))) = .911$

Predictors for Y7, using a logistic regression

Single Independent Variable Models

Variable	Wald Sig.Level
X1	.858
X2	.833
X3	.858
X4	.833
X5	.858
X6	.833
X8	.898
X9	.884
X10	.996
X11	.334

None of the independent variables are good predictors of Y7

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