CHAPTER

Research Comparing Monolinguals and Bilinguals

You may hear from others—or may be worried yourself—that learning two languages will harm your children. By far the most frequent concern is that learning a second language too early will take away from the first language. The second most frequent fear is that learning two languages and trying to be part of two cultures will create confusion about identity. Chapter 8 is devoted to the identity question. In this chapter, I consider different kinds of research evidence to help answer the following questions related to the advantages or disadvantages of becoming bilingual.

- Are bilinguals slower language learners? How do they compare with monolingual children on developmental language milestones?
- Is it better to start at birth with two languages? Do children do worse or better in either language if they wait until they begin school to learn the majority language?
- Can you learn two languages "additively," or does one language inevitably "subtract" from the other?
- What do standardized tests tell us about how bilinguals compare to monolinguals?

The short answers are:

- No, bilinguals are not slower in language development than monolinguals when comparisons are made carefully between groups of children. With respect to most developmental language milestones, bilinguals are either at the same level as or ahead of monolinguals.
- One need not begin with two languages at birth, but it is often desirable. Children do better in the minority language if the majority language is not begun until school, and they do no worse in the long run in the majority language if it is not introduced until school.
- Children can learn two languages additively, but we must exercise care not to allow one, usually the majority language, to subtract from the other.
- Finally, there are *no* tests standardized on bilinguals, so the use of existing standardized tests is categorically wrong for bilinguals. We can, however, examine data from the limited tests available and evaluate their results in light of what we know about bilingual development.

This chapter elaborates the research evidence behind these answers.

Is Bilinguals' Language Development Slower (or Faster or Neither)?

Lucia, one of our parent-respondents, says in exasperation:

> *"I have read everything and its opposite, and I'm quite confused. If there is a scientific study with statistics on the advantages and disadvantages of being bilingual that could allow us to decide clearly, 'yes it's good,' or 'no, it's bad,' I would be interested in such a study."*

In fact, there is no such study—and for good reason. We can never prove clearly, once and for all, that being bilingual is either good or bad in every instance. We cannot truly prove whether childhood bilinguals are slower in developing their language than they would be if they were monolingual. There are really two claims here—not just that bilinguals score higher or lower than monolinguals on a variety of linguistic and academic measures, but also that being bilingual is the cause of their being ahead or behind. Scientifically, what is required to prove both parts of either claim—that being bilingual makes children more or less advanced than monolinguals—is not available to us. The required experiment is not possible.

Showing that bilingualism is associated with slower or faster language development for some individuals or groups of children is relatively easy; we can make comparisons and relate measures of language development to the number of languages spoken. However, the second part, showing *causality,* is much harder.

Suppose we found that bilinguals were better than monolinguals on every measure we could think of. That would still not be enough to decide the question. We would not know if they were better *because* they were bilingual, or because of some other factor we had not ruled out. Bilinguals may get better schooling; they may come from families that provide more resources. It may be that parents who are imparting two languages to their children spend more time with their children than they would if they didn't feel responsible for providing the extra language. If we could arrange for a set of families with all the same background and resources to treat their children in a manner absolutely equivalent to that of bilingual families but not impart two languages, we might find that it is not the languages *per se* but the extra care that contributes to a superior outcome.

Lack of Experimental Studies

In medical research, for example, when scientists want to see if a new drug cures cancer, they must show not only that people who take it get better, but also rule out all alternative explanations. They do this by using an *experimental design*. Everything about all the subjects' backgrounds and treatments must be the same except the use of the drug being studied. The "experimental" group gets the drug, and a "control" group gets a placebo, which is a treatment that looks and feels like the experimental treatment but substitutes a sugar pill for the drug. The most crucial element of a true experimental design is random assignment. If there are other factors that might influence the results, people with those factors must be just as likely to be in the control group as in the experimental group. Subjects are assigned to groups randomly—for example, by picking a number out of a hat. Then, when one compares outcomes between the groups, if the experimental group does better, we can say that the drug *probably* caused the difference.

There have been no true experimental studies that compare monolingual to bilingual upbringing—and there never will be any. We cannot just go into a major metropolitan hospital and assign every other baby to be raised bilingually. Even if that were not completely out of the realm of possibility (and ethical behavior), it is equally improbable that, for the fifteen or twenty years it takes for a child to grow up, the only factor affecting how the children in the groups developed would be the number of languages spoken to them over the course of their lives.

Alternative Studies

We can never get around the obstacle to the experimental method presented by the fact that families choose bilingual upbringing for themselves. However, that does not mean we are completely helpless in our attempts to weigh the benefits of one course of action over another. We can make many shorter-term comparisons between groups and try very, very hard to make sure that our groups are equal in as many respects as we can, using what is called a "quasi-experimental" design.

Although we cannot attain a level of certainty beyond a shadow of a doubt, we look for evidence from as many sources as possible and see

how many of the findings point in the same direction. In the following sections, we will look at the evidence that has been accumulated in the following areas:

- Developmental language milestone comparisons
- Early versus later introduction of the majority language
- Standardized tests

Evidence from Developmental Language Milestones

Even some people strongly in favor of childhood bilingualism express the opinion that children make slower progress when they start out in two languages than they would if they were trying to master just one or one at a time. In fact, much of the research on early development fails to support that opinion. Early language milestones are remarkably similar everywhere around the world, regardless of which language children are learning or how many languages they are learning. As with learning to walk, all children take about the same amount of time to produce their first syllables, words, and two-word combinations. Both the average age and the wide variability around that age appear to be universal. Because parents everywhere are focused on these events, we have observations from large numbers of individuals and large numbers of different groups. Everywhere around the world, these landmarks happen at approximately six-month intervals—with mature babbling appearing at around six months of age, first words at around twelve months, and first two-word combinations at around eighteen months.

Everywhere, too, the windows around those averages are very large, approaching five months on either side of the mean for first words and six months plus or minus for first phrases and two-word sentences. So, while the figures are consistent around the world, great variation is also the rule. Therefore, within your neighborhood or your family, language development may not seem uniform at all. One average child may have a recognizable word at eight months, and another equally average child at sixteen months. I have seen a very precocious child with a word or two at only seven months and intelligent children who wait until seventeen months before they utter their first words.

Children who reach their milestones even later may still be "normal," but the timetable is consistent enough that if at ten months your baby is producing only vowels and no consonants, it is worthwhile to test his hearing. If the child is later than seventeen months in uttering a first word in any language (including sign language), you can have his hearing checked, and then you and your doctor can seek out measures of "symbolic behavior" (such as the *Communication and Symbolic Behavior Scales* of the First Words Project at Florida State University).

Given these robust behaviors and large windows of normal variation, it will be very difficult to find monolingual-bilingual differences greater than the very large differences within the monolingual or bilingual groups individually. In fact, the bilingual groups that have been examined are squarely in the middle of those norms we do have.

Mature Babbling

This milestone is a fairly sudden change from the primarily vowel-like vocalizations infants make before they master the coordination to make consonants and say them in sequences (such as "dada," "ada," or just "ba"). No matter what language or languages they are exposed to and will eventually speak, all children at this stage sound more or less the same. Psycholinguist Kimbrough Oller and colleagues have shown that this "canonical babbling" develops quite reliably between five and eight months in typically-developing children, and failure to babble by eleven months can be the first sign of a later-developing (or later-discovered) neurological problem.

In Oller's study comparing monolingual and bilingual babies, the average age for each group to produce mature, canonical babbling was 27.3 weeks and 26.7 weeks respectively. The bilinguals were an average of four days earlier. Four days is not a significant delay for the monolinguals, but it is also certainly not a delay on the part of the bilinguals.

First Words

Similarly, research on first words shows that groups of bilingual babies begin to produce words at the same time as monolingual babies speaking the same languages. In both monolingual and bilingual

populations, some children say their first words by ten months, while other children do not start until seventeen months or even later. The University of Miami Infant Studies, an older Canadian study by Doyle, Champagne, and Segalowitz, and more recently, Laura Petitto and her lab at Dartmouth have all found the average first word onset of their monolingual and bilingual groups to be within the same time frame.

The Beginnings of Grammar: Two-Word Speech

In early syntax, the picture is less clear because there have been no widespread statistical summaries of monolinguals in many different languages for us to compare against. The evidence we can find is specific to the children and constructions being studied. Nineteen months is the average age at which two-word combinations appear (e.g., "More cookie" or "Find Grover"), but it is not considered a danger sign until after twenty-four months if the child has not yet begun to put two words together. No studies have yet polled large numbers of parents about their bilingual toddlers' early phrases, but extensive reviews of the literature like those by de Houwer (1995) and Genesee, Paradis, and Crago (2004) conclude that both the rate of development and the stages bilingual children go through in learning various grammatical constructions are similar to monolinguals'. Based on their own work and that of a large bilingual first language acquisition research project led by linguist Jürgen Meisel, Genesee and his colleagues assert that bilinguals follow the same course and rate as monolinguals in each language in many aspects of their development, "from the sound system to grammar." Although more research needs to be done, there is no controlled comparison to my knowledge that indicates that bilinguals take longer than monolinguals to start putting words together according to the rules of their grammars.

So, "onset" measures are very robust. Despite great differences in child-rearing practices in different cultures, these language systems seem to "mature" at about the same time in all children.

Evidence from Other Language Landmarks

Other, smaller landmarks on the path to learning language have also been shown to be equivalent between monolinguals and bilinguals.

Recognizing the Native Language

One of the very first language skills researchers have been able to isolate in newborns is that they can recognize the language they were overhearing during their time in the womb. There are several different ways to test what infants hear, but the principle is the same—that babies get bored with one sound. When you first play a sound, babies pay attention briefly and then lose interest. If you then play the same sound again, the baby goes "ho-hum" and doesn't respond, but if you play a different sound, the infant perks up to see what's new. The babies' responses are recorded differently according to their ages. While babies are still in the uterus, researchers play two different languages for them through a microphone inserted right next to the uterine wall, and they watch for changes in heart rate. Once babies are born, researchers use different measures of the speed of their sucking or their looking preferences, as well as their heartbeat.

In the early 1990s, Moon and colleagues showed that two-day-olds can distinguish the sounds of their language from those of an unfamiliar language if the overall rhythms of the sentences are different between languages. Their tiny subjects could tell English from French and Japanese because they have different rhythmic structures, but not English from Dutch, because the rhythmic structures are very similar. By five months, English-learning babies could distinguish English from Dutch, too. At that same age, bilingual Catalan- and Spanish-learning infants could distinguish both of their languages from other languages and from each other.

Learning Phonetic Contrasts Used in Your Language

Bilingual babies also share the same timetable as monolinguals for learning the phonetic contrasts used in their languages. Recall that learning the sound system of your language is a process of learning which sound contrasts are important in your language. Once the baby knows that, she learns to ignore the sound differences that the language she is learning does not require.

According to the famous experiment by Janet Werker of the University of British Columbia, at six months, babies are all "universal listeners" and show equal interest in all sound distinctions, even many their

parents do not appear to hear. By twelve months, they become more selective and ignore contrasts that they have not been hearing in the language spoken around them, while remaining responsive to the contrasts that are found in their language. So when you play pairs of sounds—for example, *r* followed by *r, r* followed by *l,* etc.—six-month-old Japanese babies signal that *l* and *r* sound different to them, but by twelve months, they already treat them as the same sound, because *r* and *l* are variants of one sound category in Japanese.

This test has been done in several ways with bilinguals, too. Catalan, for example, makes a distinction between two *e*'s, roughly the difference between the vowels in "bait" and "bet," but Spanish treats them both as the same sound. Three groups—Catalan monolinguals, Spanish monolinguals, and Catalan-Spanish bilinguals—were tested on the distinction. All three groups, at four months, reacted to the two sounds as different sounds, but at twelve months, Spanish-learning babies treated them as the same sound. Only the Catalan and Catalan-Spanish bilinguals continued to be able to tell them apart.

Similarly, Canadian researchers testing French-English bilinguals found the same thing, but the story was a little more complex because the contrasts they tested were more complicated. The same sound must be interpreted differently in the two languages. For example, as we saw in chapter 3, the French *p* and the English *b* are the same sound when you measure them on a laboratory instrument, but the sound works one way in French and another way in English. In French, this sound (the French *p*/English *b*) contrasts with the French *b,* an easy distinction for French people to hear, but these two French sounds are both heard as *b* by English speakers. The same thing happens in the other direction, where this sound (the French *p*/English *b*) and the English *p* both sound like *p* to a French listener. A bilingual, therefore, has to switch his or her interpretation of that shared sound, hearing it as *b* when speaking English and as *p* when speaking French.

Like French-speaking adults, the French-learning babies at twelve months heard the English *p* and the English *b* as the same sound. Like English-speaking adults, the English-learning twelve-month-olds heard the French *p* and the French *b* as one sound. That is, both groups made the appropriate contrast for their language and ignored the other. The bilinguals as

a group attended to both contrasts, but at twelve months and again at fourteen months were somewhat less successful on them than the monolinguals were. When the researchers looked at individuals within the group, they found two response patterns. Half of the bilingual babies distinguished one or the other contrast—just like the monolinguals. The other half of the bilinguals discriminated both contrasts. One type of responding cancelled out the other type, so the group average did not reflect either pattern.

Dominance patterns, which we see here may develop by the end of the child's first year, make measurement of bilingual groups difficult. It looks like a jury might say, "Bilinguals acquire this sound contrast discrimination skill later; score one against bilingual." But they do not lag behind monolinguals in acquiring the skill; it just takes longer for the skill to be measurable in bilinguals as a group. In fact, some bilinguals were doing as well as monolinguals, and others were doing better than monolinguals. However, their group results might be interpreted to mean that bilinguals are slower in contrast discrimination development if the reporter is not careful to look within the group.

We will return to the question of dominance later in the chapter.

Using Close Phonetic Contrasts for Word Learning

In a new series of experiments, Janet Werker and Chris Fennell of the University of British Columbia have taken infants' phonetic learning into the realm of word learning to see when children can use their knowledge of close sound contrasts (like *b* versus *p* in "bin" versus "pin") to learn a word. They paired two objects with either a regular word or a nonsense word and taught the pairings to infants. Then they tried to see whether the babies would notice if they switched the pairing. So, in the training phase of the study, the experimenters showed the babies a short movie of a star-like object and called it a "sug." Then, in the next phase of the experiment, they showed the baby the star-like object, but this time, they sometimes called it a "sug" and sometimes called it something else—for example, a "dib." The test was to see if the infants registered surprise when the object was paired with a different, "wrong" nonsense word.

At fourteen months, the children seemed to notice when the experimenter used the wrong word for the object in the video. They could recognize it especially well with common, one-syllable real words, like "ball" or "star," and they could also do it with non-words that were very different from each other, like "dib" and "sug." When Werker and Fennell tried to teach the babies non-words that differed by just one sound, the way "bed" and "dead" do, fourteen-month-olds could not successfully perform the task—but seventeen-month-olds could. When the researchers tried the same experiment with bilingual babies at seventeen months, the babies couldn't tell the difference between these closely contrasting sounds, but they could at twenty months.

This looks like the first concrete example of a process that might slow bilinguals down in learning vocabulary. They are three months slower to use a minimal sound contrast to learn a word. This may be the earliest evidence we have of bilinguals starting to fall behind in language development relative to monolinguals. But does this really signal a disadvantage?

Will it interfere with real-world early words? Babies' words at this stage are rarely so alike as "bih" and "dih." They are learning "juice" versus "milk," "up" versus "down," and "yes" versus "no." So children can be learning words in their homes just fine without being able to do the laboratory task. It might even be helpful for bilinguals *not* to be too quick to dismiss a possible category. They may be saying, "I know that 'bih' and 'dih' are not quite the same for speaker A, but maybe they are the same for speaker B. Let me just make sure before I decide against it." So, this apparent slowness may be a useful strategy.

Making the Sounds of the Language

Young children's ability to hear and understand speech sounds is prodigious, but in their ability to reproduce what they hear, they are all rank beginners. It takes several years for them to be able to reliably make the sounds that they can hear. Direct teaching seems to be of no help. You may have tried, like I did:

Child: Pishie!

Me: Yes, those are fishies. Can you say "fishies"?

Child: Pishie.

Me: Fffffff . . .

Child: Fffffff . . .

Me: ishies.

Child: ishie.

Me: Ffffff . . . isshies.

Child: Fffff . . . ishie.

Me: Good. So, what are they? What do you see?

Child: Pishie!

In phonology, as with first words, there are very wide ranges of normal articulation—and until age three, we really have no norms. In one of the University of Miami infant studies, we conducted a standard phonological assessment in Spanish and in English with thirty-six-month-old children and compared monolingual and bilingual groups to each other.

The monolingual children were in the average range on the assessment of their phonological development. As with word learning, there were large differences even among children who were all "typical." Some children at age three spoke almost all of their sounds in the adult manner; others produced just the most basic sounds correctly—*p, d,* and *t,* but not *r, s, th,* or *l,* which are notoriously hard for English-learning children, as illustrated by the cartoon sentence, "I taught I taw a putty tat" (where *t* is used for *th, s,* and *k*). Likewise, almost no Spanish-learning children could make the *rr* sound, as in "ferrocarril" (railroad); they were also unlikely to pronounce the consonants at the ends of words, as, for example, in the Spanish word "flor" (flower). The bilingual children were somewhat more likely than the English-only children to leave off the final consonants, but they were more likely than the Spanish-only children to use them when they were called for.

The bilingual babies' performance was equivalent to that of the monolinguals. There were no statistical differences between the monolingual Spanish toddlers and the bilingual toddlers in Spanish or

between the monolingual English children and the bilingual children in English.

Becoming Intelligible Speakers

The University of Miami Infant Studies project also looked at how soon children begin to make the sounds that are unique to their languages in a recognizable way, so that listeners know what language they are hearing. For example, *p* and *t* are not unique to either language spoken by Spanish-English bilinguals (i.e., they sound rather similar in both languages). By contrast, the Spanish *r* and the English *r* are pronounced very differently.

For monolingual speakers, we found little evidence of language-specific sounds in babbling or even in early words. For her dissertation, University of Miami graduate student Ana Navarro used "blind" testing techniques to see if bilingual adult listeners could identify enough language-specific sounds in children's early words and phrases to tell which language the child was using, even if the listeners did not understand the word they were hearing. In the blind testing, listeners heard the child's taped voice alone—they did not see the child, and they did not know whether they were hearing a boy or a girl, a Spanish learner or an English learner, or a bilingual.

Navarro found that listeners could hear very few language-specific sounds in the speech of monolingual children, even that of twenty-six-month-olds. In this out-of-context presentation, listeners did fine with adult utterances, but understood less than one-quarter of the utterances of the children, regardless of whether they were spoken by a monolingual or a bilingual child. (Remember, the words were all intelligible in context, or else Navarro could not have used them in the experiment.) When the listeners did not understand a word or phrase, they also did just as poorly at identifying which language it was spoken in. They were able to correctly identify the Spanish utterances spoken by the monolingual Spanish children about 62% of the time, and they could tell which were the English utterances when they were spoken by monolingual English children at about the same rate. For four out of ten children in each monolingual group listeners were never able to tell (better than guessing) whether they were speaking English or Spanish.

Of the ten bilingual children in the experiment, seven were able to communicate to the listeners which language they were using. Three communicated intelligibly in Spanish only, and three in English only. Only one child was able to do this in both of her languages. That is, she clearly produced language-specific sounds in Spanish and language-specific sounds in English as well. Statistically, the bilingual children were neither ahead of nor behind their monolingual peers, but their equal performance was found in only one of their languages.

Navarro's experiment also illustrates that part of the subjective impression of a bilingual child's slowness may be "slowness" on the part of the parent, not the child. Even if a bilingual's first words are objectively as intelligible as a monolingual's—which they clearly were in this experiment—it may be harder for parents to find the words in what the bilingual child says to them. It will be harder for the parents to understand if they don't know in advance which language to listen for. Consider a baby-word like "apu," a fairly common child's rendition of "apple." Especially if there is an apple in the scene, one might be able to interpret an English-learning child's "apu" as "apple." But the same word is not far from "arbol," the word for "tree" in Spanish. A Spanish-learning child, especially one pointing to a picture of a tree, might say "apu" to mean "arbol." If we hear the same "apu" from a bilingual child, it will be harder for us to anticipate which one he means. One of our parent-respondents, Radha, reported that this had happened to her. She was so focused on her son's Tamil words that she missed his first English words. Another couple, also listening for the "other" language, in their case, French, realized, after hearing it for about two weeks, that the child was saying, "Wha dat?" (for "What's that?").

This may be one advantage of the OPOL and mL@Home household strategies over the MLP (Mixed Language Policy). Those household strategies help parents anticipate which language they will be hearing, so they can understand the very young child better.

The "Lexical Spurt"

So, if bilinguals are not slower at the outset, do they fall behind later?

Thanks to a new assessment tool developed in the 1990s, we now have records of how many words—of a standard set—children learn

at different ages between ten and thirty months. The original versions of these *Communicative Development Inventories (CDIs)* were made for Italian and English, but once people saw how useful they were, adaptations were created for many different languages. The word "inventories" implies that these are exhaustive lists, but it is not necessary to count a child's every last word to get an idea of how he compares to other children his age.

Parents are given a list of about five hundred common words that are drawn from the words babies often know—words for foods, toys, animals, body parts, etc. Parents check off whether the child, up to sixteen months, understands a word but doesn't say it, or, up to thirty months, understands *and* says a word. A database of responses from over a thousand children gives us a much better idea of which words children are most likely to know and, at each month, how many words the average child (the 50th percentile), the faster child (75th and 90th percentiles), or the slower child (25th and 10th percentiles) will know.

We see from the monolingual children who were sampled to establish the norms for the *CDI* that about two thirds of children have a "spurt" in their vocabulary growth curves around the middle of their second year. Until then, babies learn early words in isolated instances. With their first twenty-five or fifty words, they don't seem to have picked up the general principle for how to do it quickly. At a certain point, it's as if a light goes on and the baby realizes that everything has a name. They start going around asking, "What's this?" "What's this?" "What's this?" What had been slow growth up until this point turns into a spurt. They begin learning about twenty or more words a month for several months. (The growth in new words seems to slow down when they turn their attention to beginning syntax.)

Most bilinguals also experience this lexical growth spurt at the same time that monolinguals do. In one of the University of Miami infant studies, we graphed eighteen bilingual children's word learning at several points from ten to thirty months. While we found that children were growing typically in both languages, only their growth in one language or the other—or in both languages together, but not individually—showed a spurt. Martin, the child in our study with the largest and fastest-growing vocabulary, for example, added a spectacular ninety words a month in

Spanish from sixteen to twenty months of age, more than four times what we used as the cutoff for saying that there was a spurt. However, while his English was also making steady progress during that period, (at around the 50th percentile), it was not at the same explosive rate, so it did not qualify as a spurt. Over the next time period, Martin's Spanish slowed down, and his English showed a spurt.

To qualify as having a growth spurt in both languages at once, the bilingual children would have to score higher than 85% of the children who take the test, and the growth would have to be parallel in the two languages. Martin was well into the top 15%, and several other bilingual children in the study were in the top 25% of all of children for rate of word learning, but none qualified as having a spurt in two languages at the same time. Still, their growth was well within the normal limits for monolinguals.

Tracking growth rates in vocabulary is one area in which we can see important differences in children's development according to which language (or languages) they are learning. This was demonstrated in a study of French-, English-, Swedish-, and Japanese-learning babies by psycholinguists Benedicte Boysson Bardies and Marilyn Vihman. The Japanese babies in the study were slightly slower to reach the ten-word landmark than children in the other three language groups. When the authors investigated to find the reason for this apparent delay, they found that the Japanese "baby-words" were slightly longer than the baby words the other groups were learning, so the Japanese-learning babies had more to learn than the others. The difference was in the languages, not in the babies. So when we look at different language learners, we can expect that some differences in children's language development are not related to the capabilities of the children but to structural differences across languages.

The Size of Early Vocabularies

Here, too, in tracking the bilingual children's vocabulary growth in two languages, we begin to experience some of the difficulties that make comparisons on the same measures between bilinguals and monolinguals such a problem. One issue, as mentioned above, is that the same measure may have different meanings in two different

languages. The second problem is that, no matter what the languages, the same measure does not represent the same amount of knowledge in a bilingual and a monolingual.

Using the Communicative Developmental Inventories, it looks like comparing a bilingual's English vocabulary to the norms for English speakers and the bilingual's Spanish vocabulary to the norms for Spanish speakers should be very easy. Counting the number of words on the child's English *CDI* and the number of words on the child's Spanish *CDI* is straightforward. But then what do we compare it to?

A word is a pairing of a consistent sound associated with a meaning, but what are we counting? The sounds? The meanings? Or the pairings? When a child associates the sounds "d-o-g" with the small animal, he is pairing one "word-form" ("d-o-g") and one meaning or concept referring to the animal. If the child associates the sounds "dog" and "perro" ("dog" in Spanish) with the same animal, there are two word-forms, but just one object in the world, or referent. Is that the same as knowing two referents for two word-forms, such as "dog" (paired with an image of a dog) and "cat" (paired with an image of a cat)? The association of "dog" and "perro" with the animal entails the same number of word-forms and the same number of pairings, but one less referent.

For the monolingual, the number of words tells you the number of word-forms, the number of referents, and the number of pairings. But for the bilingual, the number of pairings is not necessarily the same as the number of referents. If you count word forms, you may be giving the bilingual child credit for more referents than the child actually knows. If you count the number of referents, you are not taking into account enough word-forms *or* enough pairings. In addition, the bilingual has at least one additional piece of information associated with each word form—that is, a "tag" to tell which language it is (which a monolingual toddler has no inkling about).

Using a *CDI* in each of the child's languages, one of the University of Miami infant studies devised a way to count and report either concepts (referents) or word-forms to compare the bilinguals' word knowledge to the word counts for monolinguals. Practically speaking, we had two lists: the child's words in Spanish on one and the child's words in English on the other. It was useful to keep them separated for some purposes—for

example, to help us gauge which language was stronger for the child at that point. But to compare the number of objects in the world that the child could name, what we called the "Total Conceptual Vocabulary," between monolinguals and bilinguals, it did not make sense to ignore the portion of the child's words in the other language. Because some of their words in each language were translation equivalents (TEs—like the "dog" and "perro" example above), the second language term for those pairs did not expand the number of concepts the child could talk about, so we were careful to count TEs only once.

The Total Conceptual Vocabulary is an improvement over making single-language comparisons, but it still underestimates bilinguals' word knowledge. There are two problems with trying to count the pairings (that is, just adding the words on the Spanish *CDI* list to the words on the English *CDI* list). First is the problem described above: you'll get the bilinguals' total word-forms right but not necessarily the right number of referents, and you are not crediting the language "tags." The other problem is that the number of words a child is credited with on the *CDI* has everything to do with how many words are on the form. The monolingual has only five hundred alternatives, whereas the bilingual has one thousand. Our solution was to get all of the information separately—word-forms or pairings (Total Vocabulary), meanings with word-forms associated with them (Total Conceptual Vocabulary), words in English, and words in Spanish. That way, we could document the complexity of bilinguals' word knowledge and make several comparisons more flexibly.

For the University of Miami Infant Studies, we started by confirming the *CDI* averages on a local monolingual population so that we could compare our bilinguals to children growing up in similar conditions and being assessed in the same way. Then we compared the Miami group's scores with the bilingual children's scores. Our research looked at receptive vocabulary in twelve bilingual children from ten to sixteen months of age and expressive vocabulary in twenty-five bilinguals from ten to thirty months of age. There were two comparison groups: one group of children learning English monolingually and another group learning Spanish monolingually. (However, because there were no norms for Spanish-learning children at that time, the Spanish

monolingual group is not represented in the graphs that follow, and the comparisons in Spanish vocabulary development for the bilinguals are approximations for illustration purposes only. Note that the Spanish *CDI* norms are now available.)

The results for *receptive* vocabulary are shown in Figure 8. The bilinguals seemed well ahead of the matched monolinguals in receptive, or comprehension, vocabulary. The monolingual English learners and the bilinguals in Spanish performed at approximately the 30th percentile (based on the norms for the English *CDI*), and the bilinguals were at approximately the 25th percentile in English. The difference between monolingual English learners and bilinguals in either English or in Spanish was not statistically significant. However, when we counted the Total Conceptual Vocabulary, the bilinguals' totals were significantly higher. Thus, it appears that in *receptive* vocabulary, bilingual infants are well above monolingual levels in the number of labels they can recognize for things in the world.

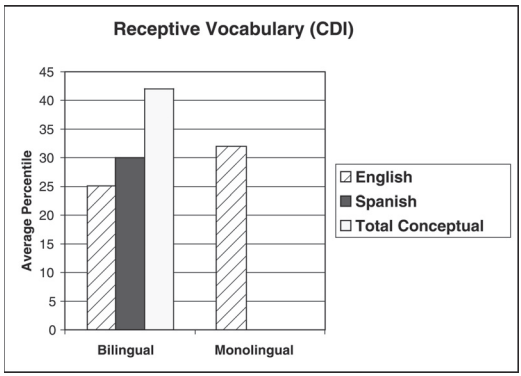

Figure 8: **Receptive vocabulary comparison for bilinguals and monolinguals**

The monolinguals in each language were ahead of the bilinguals in *expressive* vocabulary in each language individually, but even the rather large difference between the groups—in Figure 9 below, the difference between the 17th (bilinguals in English) or 15th percentile (bilinguals in Spanish) and the 34th percentile (English monolinguals)—was not statistically significant. When we counted Total Conceptual Vocabulary, instead of just vocabulary in a single language, even the non-significant difference between the monolinguals and bilinguals disappeared, and the group scores were practically identical.

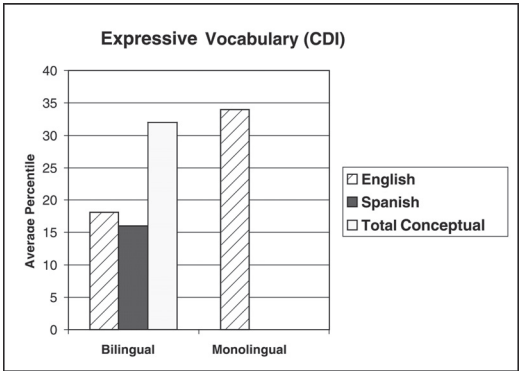

Figure 9: **Expressive vocabulary comparison for bilinguals and monolinguals**

Comparing Apples to Apples: Using the Bilingual's Dominant Language

When we compared the monolingual and bilingual vocabularies of the toddlers in the University of Miami Infant Studies, the bilinguals' average score on the *CDI* was slightly lower than that of both the Spanish and the English monolinguals. Recall, however, from Ana Navarro's study of phonology above, that some of the children in the bilingual group were Spanish-dominant and some were English-dominant, so the averages of the entire bilingual group on the English inventory and the Spanish inventory were artificially low. Their average in English, for example, included the scores of the children who were dominant in Spanish and who had relatively little exposure to English. Likewise, the bilinguals' Spanish average included the scores of the children who were dominant in English and had little Spanish. The Spanish scores of those children pulled down the bilinguals' average in Spanish. Because it is rare for bilinguals to be balanced in their two languages, counting their weaker score as well as their stronger score gives an erroneous picture of their actual skill in vocabulary. We must remember to split the bilingual group scores according to the children's dominant language before we make such comparisons. After all, the comparison is to the monolinguals' dominant language—that is, their only language, which is dominant by default. In Ana Navarro's experiment, as well as the lexical measures, splitting the bilingual group by dominant language made the difference between the monolingual and bilingual means disappear completely.

So far, we have concentrated on early development and on areas where the method of measurement is a problem. Our last two domains are areas where the focus is on the conceptual knowledge of the child—where the language is important, not for itself, but as a way to know the level of the child's *concepts*. Here, the important issue is to conduct the measurement in the language that tells you the most about the children's concepts. In these domains, bilinguals do not score lower than monolinguals, especially when they are tested in their better language.

Telling Mature Stories

As we discussed in chapter 2, children up to age five are busy mastering the grammar of sentences. Much of the development that takes place after age five involves making links across sentences. Mature speakers organize information into texts or larger structures of discourse according to the conventions of their language. One of the most important of these larger structures is the narrative: a story with a beginning, a middle, and an end, which recounts events in the past and also provides some interpretation of the events for listeners. Narrative forms are both language-specific and universal; they are one of the ways that children (and adults) make sense of the world they live in.

Psychologist Jerome Bruner distinguished the "landscape of action" from the "landscape of consciousness" in narratives. Children need to master both. They have to be able to recount a chain of events or actions in a chronological order that will not confuse the listener, and if there is more than one character involved in the story, they have to progress beyond calling everyone "he," for example, so that listeners will always know who did what to whom. However, more important than recounting the actions themselves, narrators have to make listeners *care* about the actions being recounted. They do that by bringing the landscape of consciousness to life: they explain the characters' motivations and their own reactions to the events of the story. The ability to do this combines conceptual and linguistic development in fascinating ways. Children learn to understand what others are thinking when it is different from what they themselves think, and they need to be able to use and understand the complex language required to express those

thoughts—for example, "She thought that there were crayons in the box, but it was really candy."

A worldwide study of how *monolingual* children learn to relate events in narrative form, based on one particular "frog" story, has been going on for the last twenty years. The story—*Frog, Where Are You?*—is a wordless picture book by children's author Mercer Mayer. Researchers Dan Slobin of the University of California, Berkeley, and Ruth Berman of Tel Aviv University coordinated studies of children ages five, seven, nine, and eleven, and adults in five languages—English, Hebrew, German, Turkish, and Spanish—all telling the frog story under similar conditions. Their primary findings were published in a book in 1994, but work with the frog story continues and has been done in at least eighty languages and with several groups of bilinguals and trilinguals. There are no standard scores here, but the Berman and Slobin studies give us a good idea of what kinds of developments one can expect at different ages. They also indicate which elements of narratives tend to be same across many different languages and which elements differ when told by speakers of different languages.

What do *bilingual* children do? In the University of Miami Language and Literacy Study of bilingual elementary school children, I used the frog story to compare bilingual children's stories in English with the same story they told on another day in Spanish. The bilingual participants had different language backgrounds that we matched to each other very carefully, and we also compared them with monolingual children of the same ages and socioeconomic status, at second grade and fifth grade. When we looked at how well the stories provided information about the "landscape of consciousness," we saw that the level of the child's story in one language matched the level of the story in the other language—even for children with unequal grammar skills in the two languages. When we compared the bilinguals' stories in their dominant language to the monolinguals' stories, we found that, on a number of elements, especially vocabulary and word endings, the bilinguals were sometimes still not up to the level of their monolingual peers. At the same time, however, they were as good as or better than the monolinguals with respect to the more demanding narrative elements: clear reference to characters, complicated time relationships between events, and descriptions of the characters' thoughts and desires.

Reading

Reading, too, is a skill that is, to a large extent, independent of the language in which it takes place. There are different ages at which children growing up in different countries are expected to learn to read. In the U.S., children begin with the alphabet in preschool and kindergarten, and they are expected to learn to read in first grade, at age six. In Sweden, the schools wait until children are seven before introducing reading. Learning to read is generally more difficult than learning to speak, and reading presents specific difficulties to large numbers of children (and adults). Estimates are that approximately ten percent of young monolingual children experience dyslexia, a reading impairment.

What about bilinguals? It is not known whether the percentage of dyslexics is higher or lower for bilinguals, especially those who learn to read in two languages. However, the University of Miami Language and Literacy Study showed that by fifth grade, there were no differences in reading scores between the monolingual and bilingual groups. Significantly, this project also showed quite strongly that bilinguals were not handicapped by learning to read in two languages. In fact, they did better in both languages when they learned to read in two languages rather than only in one. (Compare this to Bialystok's results in chapter 1 as well.)

Latino children who learned to read in Spanish as well as in English did better at reading in English than those who did not learn how to read in Spanish at all. It is not too surprising that performance in Spanish of children with instruction in Spanish would be better than that of children with no instruction in Spanish; the big payoff was that the children who learned to read in Spanish as well as in English also did better at reading in English.

I see many bilingual education programs making elaborate schedules for how to stage the introduction of reading in one language with at least a year between it and another language. I have never understood why. When reading is introduced in both languages at the same time, non-English-speaking children get the benefit right away of learning to read in a language that they are already comfortable in, and they do not delay getting to English.

So, for these twelve language landmarks, there is no clear evidence that groups of bilinguals are slower at learning language than comparable groups of monolinguals.

Which Is Better—Two Languages from Birth or a Second Language Second?

Can we say whether it is better to learn two languages from birth or to wait until the child is five and let the school introduce the second language? This question has two sides, depending on whether you focus on the majority language or the minority language. Constance, one of my survey respondents, worried about the majority language:

If I emphasize Greek so much when the children are little, will it hurt them when they go to school and have to do everything in English, which will be a brand new language for them? Should I try to teach them English as well as Greek in my home so they will not be behind in English when they go to school?

Pilar worried about the minority language:

If I introduce English in the home, will it diminish the children's abilities in Spanish? Am I better off waiting until they go to school before introducing English?

The short answer is "no" to Constance and "yes" to Pilar. The evidence from the University of Miami Language and Literacy Project indicates that, at least in the U.S., there is almost no difference in English achievement between bilinguals who were exposed to English and Spanish equally in the home from birth and those who had been exposed to only Spanish in the home and first started to learn English when they began to attend school. For that reason, there is little motivation to have English in the home. (One may have other reasons for it, but English achievement should not be the sole motivation.)

On the other hand, there is a relatively large advantage for children's abilities in the minority language when the majority language is not spoken in the home until elementary school.

English Achievement

The University of Miami Language and Literacy Study of bilingual elementary school children was designed to address questions like those posed by Constance and Pilar. As explained above, it was not a true experimental design, because no one can manipulate who speaks English in the home and who doesn't, but although it didn't have random assignment, it had careful control groups. That is, we selected the participants so that they would differ on just one point and be as equal as possible on everything else. The children being compared were in the same schools, they lived in the same neighborhoods, and their parents had the same levels of education. The standardized mathematics scores of the groups were equivalent, and, of course, they were the same ages. In response to the questions posed in this section, I focus on the home language differences.

Half of the bilingual families reported that they spoke English and Spanish in the home, approximately half of the time each, and the other half used only Spanish in the home until the children went to school. In each home-language group, half of the children attended Two-Way Immersion bilingual schools and half were in English-only schools. The study tested kindergarten, second grade, and fifth grade children on nine standardized tests in both English and Spanish as well as on a series of probe study measures focused on more specialized skills. I report the fifth grade results first, because those represent the longer-term, more permanent results.

When overall scores for the fifth graders on the nine standardized tests in English were averaged separately for the children with only Spanish in the home versus those with English and Spanish in the home from birth, the difference was not dramatic. The English scores for the children with English as well as Spanish in the home were barely two standard score points higher than the children with no English in the home. This was not a statistically significant difference. So, there was very little gain in English scores from having English in the home.

Unlike the fifth grade results, at kindergarten, there was an early advantage in English for the children with English and Spanish at home. At the time of that testing, the only-Spanish-at-home children were still

very new to English. The difference in their daily exposure was still a very great proportion of their total exposure to English. As they got more contact hours in English, the daily difference became less noticeable—just as you would miss $1 more if you only had $2 than if you had $2,000. The advantage the children with English in the home had in English was restricted to oral language tests, especially vocabulary tests. The advantage was statistically significant in kindergarten and second grade; it had disappeared by fifth grade. By then, the Spanish-at-home children had caught up. On the other hand, children with English and Spanish in the home had no advantage in English reading and writing skills, not even at kindergarten or second grade.

Spanish Advantage

The advantage to Spanish development by *not* having English in the home was significant at kindergarten (especially for expressive vocabulary), and the advantage continued through fifth grade. As in English, there was no benefit in reading and writing in Spanish from having only Spanish in the home—presumably because those skills are not particularly supported by the oral language spoken in the home. When all nine scores (both written and oral) for the fifth graders were combined, the advantage to the children's Spanish of having no English in the home was about four points—statistically significant but not dramatic.

Add the Help for the Minority Language from the School

When a similar comparison was made, this time between Latino groups with English only *in the school* versus those in the Two-Way Immersion programs, the results in English were quite shocking. The English-only advantage at fifth grade was barely one point in the standardized scores. There was a small advantage in English vocabulary at kindergarten that disappeared in three of four subtests by second grade and disappeared on *all* subtests by fifth grade.

By contrast, the two-way schools benefitted children's Spanish by an average of ten standardized points, a very significant difference. The advantage was greater than ten points for children with less Spanish at home, and it was "only" eight points—still a very strong difference—for children with only Spanish at home. Furthermore, the advantage of

the two-way school in Spanish was *not* present at kindergarten, so the advantage seen at fifth grade for the two-way school in Spanish appears to be entirely due to the children's experience of the school. The benefit of the half-day taught in Spanish to children's Spanish scores was very large, while from the same program, the loss to their English scores was very small.

Bilingual Preschool

Thus, parents like Constance who worry about not giving their children the benefit of starting school ahead of the game by already knowing English may want to consider a bilingual preschool for the child. This will give the child a head start in English in a sheltered atmosphere but will also support continued growth in the minority language. If children start early in a monolingual preschool, they get the idea early—when their minority language is still not well established—that English is all that matters, so I do not recommend an English preschool at a time when you could be solidifying the child's command of the minority language. In a nationwide study of a thousand families, researcher Lily Wong Fillmore of the University of California, Berkeley, showed that families whose children went to English-only preschools were five times more likely to switch to English in the home than families of children who went to minority-language or bilingual preschools.

In the research for this book, I met several parents who recounted that very experience. For example, Rakhmiel and Rose spoke only Yiddish with their son Ari until the second week of English preschool. As Rakhmiel recounts twenty-five years later, he and Ari would count the steps as they came up out of the church basement where the preschool was held—"Ein, zvei, dri . . . ('One, two, three' . . .)"—until one day Ari countered with "four, five, six, seven, eight." Rakhmiel says that from then on, Ari was no longer interested in speaking Yiddish with them. I suspect that the transition was more gradual, but it is revealing that Rakhmiel's memory locates the switch so precisely in the stairwell leaving the preschool.

Meanwhile, four-year-old Marianna is currently enrolled in a bilingual preschool in Michigan. She still speaks only Spanish in her mother's household and in her father and stepmother's household, too, but she is getting an introduction to English at a bilingual preschool. Having

Spanish alongside English in the preschool sends a clear message to the child that Spanish is important, too. It is unlikely that Marianna will abandon her first language early, as Ari did. As the University of Miami Language and Literacy Study shows, it is not essential to learn English before school, but it is important not to drop the minority language when English is introduced.

Other Concerns about When to Start Two Languages

Language Forgetting

In this connection, I recall the diplomat who boasted that his children had learned seven languages—and forgotten six of them. Traces of the different sound systems seem to remain with young learners throughout their lives, but it is amazing how quickly the use of a language can be reduced to a few simple greetings and names for relatives and foods—if it is not continually reinforced. Even adults who have not been speaking their other language for a while will take some time to "switch their minds" back to that language when they need to. But with adults (and, I will say, children over ten), if they spoke another language well, it is like riding a bike—it comes back even after many years without practicing it. Children under three who leave one language environment for another seem to lose the language that is "out of service" completely within a short space of time. Four-year-olds lose it only a little less quickly. Besides, as Olga points out (Case Study 4 in chapter 5), parents have the greatest control over their children's language patterns when they are young. That is the time when you want to build their skills in the minority language and help them want to keep using it. If not, you may wake up and find that what you so carefully nurtured in the first three or four years of the child's life is gone.

Example of the Impermanence of the Language

Nancy, one of my child bilingual resource people (now grown), recounts that Spanish was her dominant language after she lived in Chile with her parents for the three years, from ages three to five. She spent most of her time there with Spanish-speaking housekeepers and their families, to the extent that recordings of her Christmas greetings to relatives in the States during those years sounded like they were from

a little Chilean child. She imitates herself on those recordings in the stereotypical accent: "Dear Uncle Susie and Aunt Ralph, Santa Claus came and left me two pieces of crumb." When she returned to the U.S. and started first grade, she still had a strong Spanish accent in her English and was put in the reading group for Spanish speakers even though her family was not Spanish speaking.

From this early experience, Nancy's identification with Spanish was very strong, so she was shocked, she says, when she went to Mexico at age ten to live with a Mexican family and was not able to speak a word of Spanish. She opened her mouth to speak and nothing came out. It took more than a week for her to recover her Spanish and begin to make progress in it. The same thing happened the following summer, although this time, she did not panic about it, because she knew that the Spanish would come back. By then she was almost a teenager, and her Spanish has since remained with her.

Adding a Language without Subtracting from the First

I have encouraged additive bilingualism by continuing support for the first language when a second language is added, but I must acknowledge that my argument does not go both ways. The minority language does not take away from the majority language, but the majority language does take away from the minority language. So if you add a minority language, the majority language will not be diminished, but if you add a majority language too soon, or without specifically providing support for the minority language, the minority language may decline prematurely—before the majority language is in position to take its place.

In an ideal world, we would not want to envision either language taking the place of the other. In the world of official French and English in Canada, where Wallace Lambert coined the terms "additive bilingualism" and "subtractive bilingualism," it was easier for him to envision two languages on an equal footing. But in the United States, no minority language is on the same footing as English. None has the currency that English does. No language (alone, without English, too) will let your child earn a living in it here, get an education, or follow the presidential elections. So, parents of bilinguals in the U.S. must be careful to insure strong English skills along with the minority language.

Before rushing to English, though, it is important to remember that the first language provides the foundation for the languages that come after it. A strong foundation in the first language facilitates the development of subsequent languages.

We can imagine graphs representing subtractive and additive bilingualism like this.

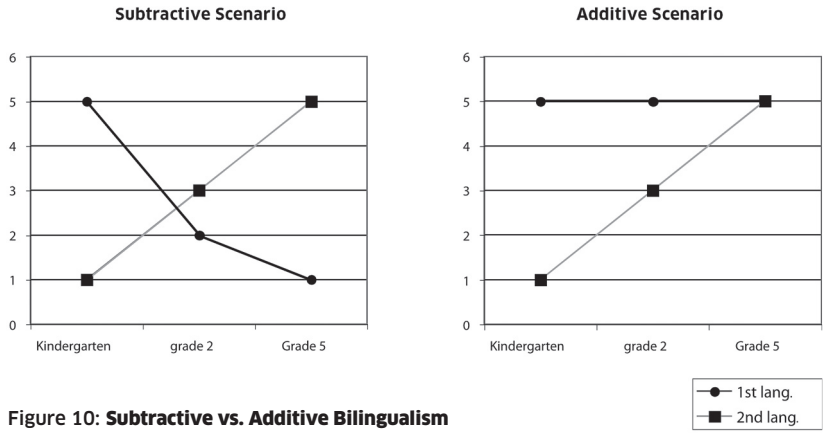

Figure 10: **Subtractive vs. Additive Bilingualism**

During the period when the first language is declining and the second is still growing, the child might essentially have no age-appropriate language. This is not such a far-fetched scenario. It is easy to imagine a child speaking a language like Romanian in the home and with the extended family until she goes to school at age five. Then, the parents, who are learning more English themselves, decide that because the child needs English at this point, they too will switch their home language to English and reserve Romanian only for special occasions, visits from abroad, and so on. In this case, the child's Romanian declines quite quickly, and her English is building quite slowly. (Canadian researcher Cummins estimates that it takes a child two to three years to develop oral language skills and five to six years to achieve age-appropriate levels of literate language.)

For a child only a few years older, the situation is quite different. The first language is more firmly established and less likely to desert the child. I have a colleague who came to the U.S. in 1956, when she was

nine years old. It was a sudden transition, and she spent some time unable to participate in her classes the way she had done in her native Hungary. The school officials were going to put her back a grade, but she was ahead of her class in math. If they put her back a year, she would be even further ahead of the lower grade. So she stayed where she was, in a "sink or swim" situation. Luckily she already knew how to "swim" in Hungarian—she could read and write and had begun learning science concepts already—so she could stay afloat long enough to learn to swim in English, too. She doesn't remember how it came about, but within the first year, she could speak and understand and do most of the things she could do in Hungarian in English as well (and went on in English to get a Ph.D.).

Using this same logic, one would not wait before adding a second minority language—and would hold off on introducing the majority language until they were both well established.

Studies Demonstrating Additive Bilingualism

Given a choice, everyone would opt for adding a second language to the first rather than replacing the first with it, but many people are unaware that there is a choice. They feel they have to choose between their two languages. It seems like common sense to them that if they take the time out of adding the second (majority) language to maintain the first, their child's progress in the majority language will be slowed. In fact, the logic is the opposite. If schoolchildren use the first language to learn the second, their progress in the second language will be faster.

Language researchers Hakuta and d'Andrea provide a powerful illustration of additive learning for minority language speakers learning English. These researchers studied three hundred eight Mexican teenagers in California. They gave them several tasks in both English and Spanish. In the graph in Figure 11 below, comparing English scores to Spanish scores, the children are grouped according to a system the researchers devised to capture fine-grained differences in the teenagers' backgrounds. In particular, for those born abroad (Depths 1 to 3), the key was the age at which the child arrived in the U.S. (younger than five, between five and ten, and after age ten). Among those born in the U.S.

(Depths 4 to 6), Hakuta and d'Andrea found that the critical variable was how many of their parents were born abroad. In the legend for Figure 11, I have lined up the authors' "depths" with the more common description of immigration history, by "generation."

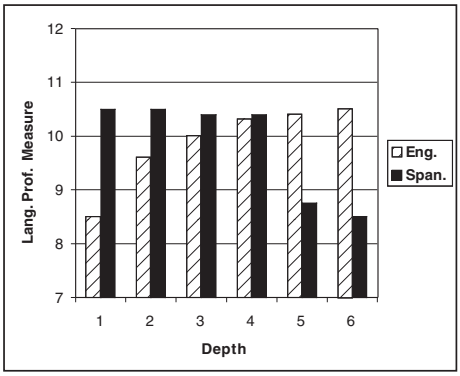

Figure 11. Additive bilingualism in immigrant families*

Legend:

1ST GENERATION

Depth 1–born abroad, children came to the U.S. after age 10

Depth 2–born abroad, came to the U.S. between 6 and 10

Depth 3–born abroad, came to the U.S. by age 5

2ND GENERATION

Depth 4–born in the U.S., both parents born abroad

Depth 5–born in the U.S., at least one parent born in the U.S.

3RD GENERATION

Depth 6–at least one grandparent (and parent) born in the U.S.

Figure 11 shows the scores the six groups of bilingual teenagers earned on a language task they did in English and in Spanish. The pattern of results does not follow the generations. Depth 3 (a subset of the first generation) and Depth 4 (a subset of the second generation) were the strongest bilinguals—the most balanced, with the highest scores in both languages. These are the first generation children who came to the U.S. by age five and the second-generation children who were born here but *both* of whose parents were born abroad. What do these two depths have in common? Early exposure to English (begun by age

* From Hakuta, Kenji, and D. D'Andrea. "Some Properties of Bilingual Maintenance and Loss in Mexican Background High School Students." *Applied Linguistics* 13 (1992): 72–99. By permission of Oxford University Press.

five)—in order to have strong English—and parents who speak mostly Spanish in the home—in order to have strong Spanish.

This graph makes a strong case for additive bilingualism. Depths 1, 5, and 6 seem to show that either the Spanish or the English score can be high, but not both. If we looked only at those three groups, we might want to agree with those who say one language takes away from the other. But Depths 3 and 4 strongly contradict that view. The children in Depth 3 and especially Depth 4 have identical scores in English and Spanish, and they are both high. These two groups have both the motivation and the opportunity for maintaining Spanish. When we look at the relationship between English and Spanish, we see that the children's English skills rose very quickly within the first generation, at a time when Spanish skills were still at a peak. English did not wait for Spanish to "disappear" to rise to native or near-native levels. It was well established along with high Spanish scores. The sharp decline in Spanish came *after* the rise in English: in this illustration, the decline came two "depths" later, at Depth 5. Not coincidentally, after Depth 4, Hakuta and d'Andrea found a strong shift in the *parents'* language as well from using mostly Spanish at Depth 4 to using mostly English at Depth 5. Compared to Depth 5 and 6 parents, Depth 4 parents also had stronger ties to their country of origin and went back there or had visitors from there more often.

What Do Standardized Tests Tell Us about How Bilinguals Compare to Monolinguals?

I have concentrated on arguments in favor of becoming bilingual, but you will also see studies that say bilinguals get lower scores than monolinguals on common standardized tests of student achievement. What are you to think when you see headlines declaring that bilinguals are pulling down scores for their schools on standardized tests across the nation?

Some of these headlines will be based on faulty studies. They may be making an uneven comparison, using an inappropriate measure, or in some other way reporting slanted information. Some of them, though, will be based on true differences between bilinguals and monolinguals. In those cases, I want to make you aware of yet another potential flaw in the argument. In some cases, the comparisons that they are based

on may be valid, but the inferences drawn from the comparisons are not. The areas of the most persistent differences will be principally vocabulary and morphosyntax (described in chapter 3). Those focused areas relate to broader language skills and intelligence differently for bilinguals than they do for monolinguals.

Unequal Comparisons

Bad testing of bilinguals has a long history. In the sections that follow, I take up various problems with testing, especially with standardized tests that are, at present, categorically inappropriate for bilinguals.

The earliest studies comparing bilinguals' and monolinguals' language development and intelligence from the 1920s and 1930s failed to match the groups on anything but age, and there were many more differences between the children being compared than just their monolingualism or bilingualism. Most of the monolinguals were middle-class children familiar with test-taking. Most of the bilinguals were new immigrants unused to the situation of testing and not acquainted with many of the situations that were the background for the items in the test. For example, a fellow professor at the University of Miami remembers that when he came to the U.S. from Hungary, he was given a common IQ test, the Wechsler. To this day he remembers one question he missed about how to make change for a dollar. Because Hungarian children in those days were not supposed to handle money, he was not only unfamiliar with the nickels, dimes, and quarters in the pictures but also with the whole concept of making change. Despite being more advanced than most American children his age in mathematics, he missed the question. For many years, little thought was given to whether a test was culturally fair to the people taking it.

Socioeconomic Status (SES)

Since the first days of the Civil Rights movement in the U.S. in the 1960s, numerous studies, including our University of Miami Language and Literacy Study, have shown that socioeconomic status (SES) has a large effect on children's standardized scores—so much so that some people claim that the SAT score is more highly correlated with parents' income than with scholastic aptitude.

In the University of Miami Language and Literacy Study, we were able to demonstrate this strong association of SES with scores in a bilingual Latino population having a wide range of SES. The Latino population of Miami is not like other immigrant communities in a number of ways, especially in the range of social classes found there. The Latinos in Miami—Cubans and other Central and South Americans—are not predominantly of a lower socioeconomic status than the monolinguals, as is the case elsewhere in the United States. Latinos in South Florida are bankers, lawyers, politicians, doctors, and so on. A large proportion of them are politically powerful and economically well-off. Because of the wide range in the sample, we could compare Latinos of high SES to Latinos of low SES and also compare them to non-Latinos of high SES, and we could compare Latinos of low SES to non-Latinos of low SES, instead of the more usual comparison between non-Latinos of high SES and Latinos of low SES. In fact, in this Language and Literacy Study, SES was the strongest statistical effect (after age) for all the English tests (but not the Spanish tests). In many comparisons, the difference between high and low SES *within* the language groups (both bilingual and monolingual) was greater than the difference *between* the language groups.

Because most bilinguals in the U.S. are immigrants, and most immigrants have lower socioeconomic status than the leaders of the Latino community of Miami, a large proportion of studies of bilinguals are done with low-SES bilinguals. Any time a study does not specifically explain how the researchers took SES into account, it is almost certainly flawed in that respect. That is, unless the authors state otherwise, we can assume that comparisons of bilinguals and monolinguals confound language background and SES, and we can be skeptical of their findings.

Language Experience

To make matters worse, old-fashioned research mostly done in the 1920s and 1930s often tested the bilinguals in a language they did not know or had just started learning. I don't think my IQ would be very high if it were measured by a test I took in Russian, a language I studied in school for only two years. I would be justified in saying

that the test did not measure what it was supposed to measure—or what it measures for people who speak Russian fluently. Conversely, when studies did not confuse language exposure for language ability, the comparisons of language scores were not so one-sided.

The research tide turned in the 1960s with the study done by Peal and Lambert, two Canadian researchers, comparing bilingual and monolingual children in a school in Canada. Here, bilinguals were doing better than monolinguals. They were more divergent thinkers, better problem solvers, and ahead in content in school. These studies, however, suffered from another flaw: a self-selection bias. Rather than being randomly assigned, children in the bilingual school had chosen to go there, so their motivation might have been greater, while the comparison group attended their neighborhood schools. Furthermore, the researchers chose for the study only children who were balanced bilinguals—so they may have also selected only the strongest students among those in the bilingual program. It makes sense to screen out individuals who were essentially monolingual with just a smattering of experience in a second language, but the preselection potentially invalidates the comparison.

Faulty Predictions

College Entrance Exams and Bilinguals' Academic Success

Parents in a professional family voiced to me a specific concern about how their bilingual children would do on the college entrance exams. Maya asked, "If our children do not hear sophisticated uses of English vocabulary in our dinner-table conversation with them (because we use another language), how will they do well on their college entrance exams, which depend so heavily on advanced vocabulary?" Her concern is not unfounded: college entrance exams present an unfair obstacle to bilingual students, but not just for the reason Maya feared. I will discuss below some issues related to vocabulary, but a study I did at the University of Miami illustrates how college entrance test scores made the bilingual students look weaker academically than they were.

When Spanish-English bilinguals do badly as a group on their tests, the large standardized testing companies claim to be "just the messenger." They say it is not the test's fault; it's that the bilinguals are not well

prepared. This assertion was hard to accept at the University of Miami, where Latino bilinguals are among the better students. They are not poorly prepared, they do well in their classes, and they graduate on time. In fact, with the help of the Office of Institutional Research there, I was able to compare the grade point averages (GPAs) after four semesters of all the Latino bilinguals who had entered the university in a given year with those of all the monolinguals who entered the same year: 2.96 versus 2.95 (on a scale of 0 to 4). The bilingual students' GPAs were .01 higher than the monolinguals'. That's not a significant difference, of course, but it also makes it safe to say that these bilingual students were not worse students than their monolingual peers.

Then I looked at their Scholastic Aptitude Tests (SATs), both Verbal and Math. The bilinguals' average score on the SAT was 50 points lower (on a scale of 200 to 800) than the monolinguals' on both the Verbal and the Math subtests. That *was* a statistically significant difference. So what was going on? The SAT is supposed to be a predictor of how students will do in college, and, in fact, the University of Miami had a policy at that time not to accept students with SAT scores lower than 525 on each section unless there were exceptional circumstances. But here was a group of several hundred successful students who had an average SAT subtest score of 500, clearly below the cutoff. If the SAT were the only item in the students' portfolio, none of these highly successful students would have been admitted. I did a statistical test to find out whether the SAT scores and the grades were related systematically. There was indeed a statistical relationship between SAT scores and GPA for each group separately. For the monolingual students, an SAT Verbal score of 550 was shown to "predict" a GPA of 2.95. For the bilingual students, an SAT Verbal score of 500 was shown to predict a GPA of 2.96. We can only speculate as to what it is about being bilingual that made the SAT score of a successful bilingual student lower than the score of a successful monolingual student. However, in that study, it is clear that the SAT was not "just the messenger." The test was clearly giving the wrong message about the bilinguals as a group.

Lack of a Proper Reference Group for Bilinguals

I suspect that all standardized tests are a little off in their evaluation of what average performance for bilinguals is. I can make that statement

with a high degree of confidence because there are no standardized language or intelligence tests that are normed on bilinguals (although I'm glad to report that such tests are under development). Thus, at present, *no* standardized score quite fits a bilingual.

A standardized test score is basically just a score that expresses how the performance of the individual taking the test relates to the average score earned on that test by a group of people who were specially selected because they share characteristics with the individual you want to evaluate. The people selected for the norming sample—usually one hundred or more children at each age—take the test, and their scores are analyzed. A standardized score of 100 on a standardized test with a mean of 100, for example, means the person with that score was right in the middle: half of the people in the norming sample got a higher score and half got a lower score. A norming sample based on the general U.S. population includes in it the same percentage of white middle-class children, white working-class children, African-American middle-class children, African-American working-class children, Latino children, Asian-American children, Native American children, and so forth, as found in the last U.S. Census. The average score (50th percentile) for the norming sample is called 100, and then the test developer calculates the 80th percentile (approximately) and makes that a score of 115, the 20th percentile (approximately) becomes 85, and so on. If a child's score is lower than 85, you know that the child's performance is comparable to that of the lower-scoring children in the norming sample.

Invalid Inferences from Standardized Test Scores

Vocabulary tests make a good illustration of the consequences of having the wrong reference group to compare to. Single-language vocabulary scores even of very able bilinguals tend to be lower than those of monolinguals of a similar background. A comparison to a monolingual norming sample compares monolingual to monolingual on 100% of their vocabulary. Unlike a monolingual child, a bilingual child has words for some of the concepts he knows in one language and words for other concepts he knows in the other language. There will be some portion of his words for which the child can answer equally well in either language—those that are translation equivalents of each other.

But even the most balanced bilinguals have some words they know in one language and not the other—for both languages. In a number of studies, we found that almost all of the participants, especially children, had some vocabulary that they knew in only one language, even in their weaker language.

So, if you give a Russian-English bilingual a standardized test in English, you will give him credit for words he knows in English and not in Russian, and his standard score will be lower than what the sum total of his two languages would yield. Similarly, if you give him a standardized test in Russian, you will credit words known in Russian but not in English. That score, too, will be artificially low. Neither score counts all of the bilingual's knowledge, and neither score compares it to an average for other bilinguals of a similar background and similar language exposure. Even a balanced bilingual who has the advantage of being tested in both languages—including his stronger one—will have two slightly low scores that don't represent the totality of what he knows.

A single-language measure of vocabulary may be instructive for some purposes—for example, to plan an instructional program for a child based on his knowledge of a particular language. However, vocabulary is often used as an indicator of more general academic aptitude. With monolinguals, the inference is usually justified, but with bilinguals, we see clearly that it is not.

In a recent reanalysis of the data presented in the book *Language and Literacy in Bilingual Children*, we found what psycholinguist Kim Oller, our coauthors, and I call a "profile effect." Monolingual students with low scores in vocabulary were generally low across the board. So for monolinguals, low vocabulary scores predicted low reading and writing scores, and one has cause to worry that a limited vocabulary is a marker of limited skills generally.

You cannot make the same inference for bilinguals. Bilinguals with low scores on vocabulary tests were no less likely than bilingual children with high vocabulary test scores to do well on the other tests. The study provided clear evidence that low vocabulary test scores are not at all a marker of poor skills generally for bilinguals.

Vocabulary, as you recall from chapter 2, is the part of language that has the least specialized processing and that has no critical period. We learn it all our lives. And the specific vocabulary learned in one language will not be much help in learning vocabulary in another language (until a much later age). So vocabulary takes time, and it is directly related to the amount of exposure.

Relation of Morphosyntactic Accuracy to Other Language Skills

In addition to vocabulary, there is another area where persistent differences are observed in the rate of acquisition of specific structures. The other area where even careful comparisons often favor monolinguals is morphosyntax (as introduced in chapter 3). As we saw in chapter 3, morphosyntax is a level of language between the lexicon and syntax (in our "language tower" in chapter 2) that governs how words are put together and used appropriately in sentences. Morphosyntactic accuracy involves some fine points of grammar, especially word forms and word endings. Because the bilinguals have less exposure to the structures in comparison to monolinguals, they appear to take longer than monolinguals to learn those forms. One can know the general principles of how words are combined in a language but not know all of the particular lexical items that may be exceptions or where the rule may apply slightly differently. There are currently no norms for bilinguals that will assess whether a child is making satisfactory progress in morphosyntax. We do not know exactly how long it takes bilinguals, especially in their non-dominant language, to hear a particular structure enough times in enough different contexts to be able to figure it out in all its complexity. Therefore, there is a period of time when the morphosyntax of bilingual's speech may not match the maturity of the other elements of the child's language (and conceptual development).

In monolingual children, the failure to have developed key areas of morphosyntax—as we saw in the discussion of Specific Language Impairment (SLI) in chapter 6—is taken to be a sign of language delay more generally. In bilingual children, in contrast, it is often just an indication that they hadn't yet had enough time and opportunity to

completely learn that aspect of the language. They have not yet reached the learning threshold for that structure. Except in cases where the bilingual child's input may be faulty (as in some communities with few monolingual speakers of the respective languages, like in some Latino neighborhoods in Miami that we observed), children's progress in the sequence of stages involved in learning different constructions is on track but slower, so the lack of some specific forms will not be an indicator of developmental delay. Bilingual children catch up faster than children with SLI.

However, these are very salient errors that can color one's impression of a person's speech generally and result in a negative response to the person out of proportion to the error. I compare it to the impact of spelling errors in formal writing. A document feels less official when it contains even one spelling error, even if it is still perfectly well worded and understandable. We once received a note from our daughter's teacher reporting some incident of her misbehaving in class. The note contained two common misspellings ("it's" for "its," and "definately" for "definitely") that kept us from taking the message as seriously as we should have. Twenty-five years later, we have forgotten the content of the message but remember the spelling. I am not advocating sloppy spelling, but its importance can be overestimated in assessing fluency, especially multiple fluency. Such absolute snap judgments and cultural biases must be tempered by consideration of other factors, as the research within the field is starting to do.

Morphosyntax Tracks Language Experience Similarly in L1 and L2

Even very advanced second-language learners report difficulty with fine points of the morphosyntax, like the endings used for different genders in languages like German or Spanish—for example, "el sapo" (toad) is masculine, and "la rana" (frog) is feminine. They can be correct 98% of the time, but one only remembers the 2% of errors. Our BSG colleague Virginia Gathercole looked at children's knowledge of exceptions to gender rules in Spanish. For example, "agua" is a feminine noun, but the article used with it is masculine—"el agua"—not, as one would expect, feminine—"la agua." This switch may be motivated by phonetic

reasons, the way English changes "a" to "an" before a word beginning with a vowel: "an apple," not "a apple." But although it makes sense, it is not applied across the board, so there are other words, like "la audiencia" ("the audience") or any adjectives that begin with "a," as in "la alta muchacha," where the "la" does not change.

Another example of Gathercole's test cases is learning the "much/many" distinction in English. For this structure, like many others she has studied, Gathercole charted a learning sequence based on the stages monolingual children go through as they get more exposure to and hear more instances of the irregular patterns. In English, for example, knowing when to use "much" as opposed to "many" is difficult in ways we rarely think about. It requires children (first or second-language learners) to figure out whether the following word refers to an individual item or a substance and whether it can take a plural or not: "much water" is good, but "much trees" and "much waters" are not; likewise "many trees" is good, but not "many tree" or "many waters." Earlier work by Gathercole showed that monolingual English-learning children master the "much/many" distinction in stages. They first show that they know the basic distinction, recognizing what one can say (around age five), before they reliably reject what one cannot say. The progression is roughly first rejecting "much boy" around age five, and then rejecting "many boy" around six and a half years. At that point, children still accept "many water," which they then reject around age seven, but they still accept "much boys," which Gathercole found that many ten-year-olds would accept as okay.

Her work shows that the stages bilinguals go through in getting the different parts of the structure correct are the same as those that monolinguals go through, but the process takes bilinguals longer, approximately in proportion to the amount of exposure they have to the language where the construction is found. The bilinguals in her study did not show evidence of learning poorly, but of taking longer to get the required amount of exposure for these more advanced elements of grammar.

As a general conclusion, we see that comparisons between bilinguals and monolinguals are tricky and more often than not, downright misleading. Much of what one reads in the press, for example, uses a

slanted definition of the word "bilingual." Too often in public discourse in the U.S., the term "bilingual" is used to mean "a person of a low socio-economic status with limited English skills." In many school districts, it is a synonym for "LEP," Limited English Proficiency. However, when you look carefully at comparisons of bilinguals, where bilingual truly means "speaks two languages" and all other characteristics of the individuals being compared are equivalent, you will see equivalent performance. Hopefully, for our bilingual children, one day soon the situation will change, and instead, we will see books and articles asking whether monolingualism is harmful for our children.