

2010

Primary students' proficiency and achievement: the difference two-way immersion programs can make

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**Primary students' proficiency and achievement: The difference
two-way immersion programs can make**

by

Holly Janelle Kaptain

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Major: Education

Program of Study Committee:
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Ames, Iowa

2010

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DEDICATION

It is with great joy that I dedicate this dissertation to my family. To Alex, Elea, and William, your great patience, love, and understanding will never be forgotten. You are the best kids a researcher could have! You have kept me grounded throughout my educational career, reminding me what is *truly* important in life. I will do everything possible to support you likewise when it is your turn! To Mom and Dad, your encouragement and support meant the difference between staying the course and giving up—thanks for believing that I could, and should, pursue my degree and take this step. To David, you have not only sacrificed your personal time and pursuits to support me, but you have believed in me and prodded me at every step. This would never have happened without your commitment, which many times surpassed my own, nor without your patience and understanding for what it takes to complete an advanced degree. Thank you not only for supporting me verbally, but in undertaking to fill every gap at home left behind by the many demands this project placed on me, without complaint. You are, quite simply, amazing and I love sharing this life with you.

I thank my many friends at home who have encouraged me and prayed for me. I am humbled by you! I also thank the teachers and administrators at our research sites, especially the treatment school. You were amazing to work with and you helped make this project fun and enjoyable. I looked forward to every single visit. Last, I thank my colleagues and friends at the National K-12 Foreign Language Resource Center. It has been a long road, but well worth the trip! I couldn't have asked for better friends on the journey.

And finally, I give all glory and honor and praise to my Lord and Redeemer Jesus Christ! It is my relationship with Him that has spurred me to value and love every student I have had the privilege of teaching or working with, regardless of income level, native

language, or color. Social justice is not just a perspective, for me it is a moral obligation. I only pray these words may in some small way promote better educational programs, better policies, better teaching, and better achievement for all students.

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Chapter One: Introduction

There is perhaps no other time in history when the future of Latinos in the U.S. has been so bleak. Today, one of every three Hispanic American adults has dropped out of high school (Pew Hispanic Center, 2010; National Center for Education Statistics, 2007), over one-fourth live at or below the poverty line (National Poverty Center, 2009), and Hispanic Americans continue to lag behind their White and non-White peers on national, norm-referenced measures of achievement. The educational success of Hispanics has long been an issue of concern. The President's Advisory Commission on Educational Excellence for Hispanic Americans¹ stated over ten years ago:

The nature of the problem with the education of Hispanic Americans is rooted in a refusal to accept, to recognize, and to value the central role of Hispanics in the past, present, and future of this nation. The education of Hispanic Americans is characterized by a history of neglect, oppression, and periods of wanton denial of opportunity (1996).

As the President's Advisory Commission confirms, there is indeed a problem with the education of Hispanic Americans in the United States.

The National Assessment of Educational Progress (NAEP) is administered to students nation-wide to enable comparisons of academic achievement across groups. NAEP data indicate that Hispanic students have consistently scored below White students for decades, with a gap of almost 25 points (on a scale of 0-500) (National Center for Education Statistics, 2009). The gap is even greater for language-minority Latino students, and although these minority groups have made gains in overall NAEP performance, White students have similarly improved, leaving the achievement gap unchanged (National Center for Education

¹ The author acknowledges that specific terms for designating ethnicity are largely a matter of personal preference. For this paper, in an effort to be inclusive of all Spanish-speaking and Spanish-language-heritage groups, the terms "Hispanic American," "Hispanic," and "Latino" will be used interchangeably..

Statistics, 2010).

The need to effectively educate Hispanic language-minority students is undeniably critical, yet the research literature indicates that mainstream public education is ill equipped to meet the challenge. In research studies on teacher attitudes toward English Learners, mainstream, non-ethnic White teachers were found to be completely unprepared to effectively and successfully integrate ELL students into the classroom (Penfield, 1987; Clair, 1995; Tan, 2001), and are more likely to attribute differences in achievement (i.e., lower achievement) by language-minority students to characteristics related to their ethnicity (Avery & Walker, 1993; Penfield, 1987). García (1993) found that teachers rated students with heavy accents and nonstandard English as less competent than their standard-English peers. Williams, Whitehead, and Miller (1972) found that Anglo teachers rated minority students as having more non-standard English and as being more ethnic compared to the ratings of their ethnic/minority colleagues; they also found that many teachers confuse language difference with deficits, regardless of the students' cognitive functioning or ability that are observed in the classroom.

Byrnes, Kiger, and Manning (1997) mention a study that found 50% of teachers held negative, stereotypic language attitudes toward nonstandard-English speaking children, especially those from lower-socioeconomic-status groups. They maintain that “teachers’ frustrations over not understanding a child’s language and culture can turn to negative feelings and affect a teacher’s academic expectations for a language-minority student” (p. 639). In a study on Latino students who drop out, Steinberg, Blinde, and Chan (1984) found that teachers and school personnel are more likely to interact negatively with lower class, minority, and non-English speaking students.

Hispanic students' proficiency in a minority language is often perceived by Anglo, mainstream teachers as a "problem" (Escamilla, 2006; Garcia, 1993); this prevailing attitude may influence teachers' evaluations of student performance and achievement (August & Hakuta, 1998; García-Nevarez, Stafford, & Arias, 2005), and increase the language-minority students' sense of isolation and marginalization (Suárez-Orozco, Suárez-Orozco, & Doucet, 2004). The education of language-minority students has been researched, debated, and argued for decades (Cummins & Swain, 1986), but the issue remains one of contention among educators and continues to draw attention beyond the educational arena into a social one (Escamilla, Chavez, & Vigil, 2005). Ideologies exist beyond the boundaries of public schools, in the larger socio-cultural context, that espouse English-only, anti-minority themes; these ideologies may shape policy or even theoretical frameworks for research and education (Lucas & Katz, 1994; Mora, 2009; Wiley & Lukes, 1996), and they contribute to Hispanic language-minority students' feelings of isolation or marginalization from dominant culture (Suárez-Orozco, Suárez-Orozco, & Doucet, 2004). The organization U.S. English, for example, is a privately funded citizen's action group that has lobbied for legislation banning bilingual education in states across the U.S. (U.S. English, 2010). This organization's ideology is based on the speculative notion that maintaining one's native language (other than English) precludes the ability to acquire adequate proficiency in English—that successful acquisition of English must be at the cost of one's native language. As will be discussed in later paragraphs, the research literature does not support this linguistically-exclusive stance (Cummins & Swain, 1986; Lambert, 1977).

In the midst of the debate over the methods and programs that best serve these students, Hispanic language-minority students' academic performance continues to lag

behind their White counterparts as it has for decades. Even more disturbing for the future, Hispanic language-minority students finish high school, pursue higher education, and complete college degrees at much lower rates (Adelman, 2007; Ficklen & Stone, 2002; Garcia, 2004; Yun & Moreno, 2006).

Developing bilingual skills seems to be viewed in this country as both a blessing and a curse (Wiley & Lukes, 1996). Persons who consider themselves bilingual (or becoming bilingual) can usually be classified into two broad categories: those in society who are representative of a minority language and are acquiring the majority language, such as English learners in the U.S.; and those who are majority-language speakers who are seeking to acquire a second (minority) language. Most research studies cite benefits of bilingual education for the latter group but drawbacks for the former, particularly in programs that promote a subtractive bilingual environment (Lambert, 1977; Cummins & Swain, 1986). The debate regarding whether or not bilingual programs are the best means to effectively educate English learners and develop their English proficiency as fast as possible continues to play out in the educational and political realm, while researchers seek more answers to the questions regarding what the benefits of bilingual education are, how these benefits are manifested academically and linguistically, and what these results signify to practitioners and policy-makers (Bialystok, 1998; Wiley & Lukes, 1996).

Under what circumstances, then, are Hispanic language-minority students effectively served in the classroom? Researchers have identified the general characteristics of the most effective programs for language-minority students, separate from the specific model and language of instruction. These programs have demonstrated consistent success in achieving high academic outcomes with their language-minority students (Garcia, 2004). The

characteristics include:

1. Student-centered learning. Students are actively engaged in their own learning, activities are meaningful and language-rich, and students are engaged in cooperative, interactive learning activities.
2. Primary language foundation. Primary language is considered an asset in students' educational foundation and is nurtured as such. It is carefully and purposefully integrated into instruction.
3. Strategies and contexts for second-language development. These are carefully constructed and organized to meet individual needs, are meaningful, and enhance student understanding.
4. Parent (and community) involvement. There are strong home-school connections at work; parents are involved in their child's education and are welcomed in the building.
5. Cross-cultural interactions/mainstream integration. Cross-cultural interactions are planned and supported by teachers and school leaders to foster cross-cultural awareness and appreciation. These interactions include integration at some level with mainstream classrooms and students (August & Hakuta, 1998; García, 2004; Thomas & Collier, 1997).

In light of these findings, language-minority students can achieve academic success (Garcia, 2004), such as performing at the same levels as their English-speaking peers on district and state assessments. The most effective programs are those that fall under the classification of Dual Language, a broad term that encompasses any "program that provides literacy and content instruction to all students through two languages and that promotes

bilingualism and biliteracy, grade-level academic achievement, and multicultural competence for all students” (Howard, Sugarman, Christian, Lindholm-Leary, & Rogers, 2007, p. 1).

Also called bilingual programs, dual language programs are focused on maintaining native language proficiency while developing English skills, thus characterizing them as having an additive bilingual philosophy rather than subtractive. Subtractive bilingual programs are those that seek to replace a student’s first language with the dominant or majority language, and programs that maintain the native language while adding the dominant language are considered “additive” (Cummins & Swain, 1986).

Two-way immersion programs are considered dual language programs and have been shown to have some of the greatest success with language-minority students (Collier & Thomas, 2004; Bikle, Billings, & Hakuta, 2004). Two-way immersion programs are those that involve both language-minority and language-majority students in the bilingual/biliterate instructional environment in the classroom (Cloud, Genesee, & Hamayan, 2000; Lindholm-Leary, 2001). Congruent with the program characteristics outlined above, two-way immersion programs integrate language learning with content instruction and emphasize cross-cultural skill development. Such an approach is ideally suited to the linguistically diverse students in the two-way immersion classroom, students who represent both the minority and majority languages. Each group learns a second language and develops both bilingualism and biliteracy; two-way immersion is an enrichment program for both populations.

Purpose of the Study

It is in light of the issues described above concerning the benefits and impact of bilingual education on both language-minority and language-majority students that this study

was conceived. The researcher examined in greater depth the possible linguistic and academic benefits that may accrue to language-minority as well as to language-majority students who are enrolled in a two-way immersion program.

The purpose of the studies discussed in the next two chapters was two-fold. First, the researcher intended to compare the language proficiency of bilingual students (English/Spanish) in a Spanish-English two-way immersion program (treatment) with the language proficiency of Spanish-speaking bilingual (ELL) and English monolingual students in a traditional English-only program (control). The students at both the treatment and control schools represented language-minority and language-majority groups, as defined by home language surveys completed by parents of all incoming students at each school. Information collected on the home language survey was confirmed through teacher observation during the first several weeks of school.

Knowing whether students' differing levels of language proficiency, particularly their native language performance, correlate with their performance on a standardized academic measure such as the ITBS, is a critical part of understanding those factors pertaining to language minority students' success in the classroom. It also allows one to simultaneously examine any cognitive benefits that may accrue to language-minority or language-majority students from being involved in a bilingual program.

Limitations of the Study

This study focused on K-3 students enrolled in a two-way immersion program at a large urban elementary school in a Midwestern city in Iowa. The students were from the neighborhood but were voluntary participants in the program. Because this was not a random sample of a large population, the generalizability of findings is decreased, and the

small sample sizes represented difficulties in analyzing and interpreting data. Another limitation is the lack of baseline data for each child. Much of the data collected through this research study was begun during the student's first grade year, although students at the treatment school began the two-way immersion program in kindergarten. The research team was unable to administer the vocabulary assessments prior to students' beginning the TWI program. Without assessment data prior to the beginning of the first year, comparisons of gains in students' vocabulary development do not reflect a pre-/post-test model.

Another limitation of this study was the reliance on a single measure, the norm-referenced receptive vocabulary assessments in Spanish and English, to quantify students' language proficiency in each language. How to assess language proficiency with both validity and reliability has long been a subject for debate. For this research study, the decision was made to use a receptive vocabulary measure. This was decided because of restrictions in time, finances, and the availability of alternative resources. It was with an awareness of this limitation that the study was conducted. These assessments do represent at least one tool for measuring students' vocabulary knowledge in both languages. It was not the intent to compare these students with students in other states or countries; rather, the instruments were used as an internal measure with which the students at the treatment and control schools could be evaluated and compared.

Organization of Study

This thesis is organized into five chapters, three of which are to be submitted as articles for publication in professional journals. Chapter One introduces the study in its entirety and explains the need for and limitations of this particular research study. Chapter Two serves as the first article and presents a summary of current thinking in the successful

education of language-minority students, particularly Hispanic language-minority students. For the second article, Chapter Three, students' language proficiency was assessed by evaluating their receptive vocabulary knowledge in each language, English and Spanish. In the third article, Chapter Four, the researcher examined treatment and control student performance on the Iowa Test of Basic Skills (ITBS), and statistically tested the relationship (if any) that exists between the two-way immersion students' performance on the PPVT and TVIP and their subsequent performance on the reading and mathematics subtests of the ITBS. The final chapter, Chapter Five, is the unifying conclusion for all of the articles that discuss the review of literature and the results of this study.

The articles that follow all relate to the research questions this study was designed to investigate. These questions include:

1. Do English learners in a Spanish two-way immersion program have better English proficiency when compared to English learners in a traditional, English-only program, as measured by a standardized receptive vocabulary assessment in English?
2. Do Spanish-speaking English learners in a Spanish two-way immersion program have better Spanish proficiency when compared to Spanish-speaking English learners in a traditional, English-only program, as measured by a standardized receptive vocabulary assessment in Spanish?
3. Do English speakers in a Spanish two-way immersion program have better English proficiency when compared to English speakers in a traditional, English-only program, as measured by a standardized receptive vocabulary assessment in English?

4. Does bilingual students' knowledge of two languages, as measured by two standardized receptive vocabulary instruments for both languages, have a relationship with their academic performance in reading?
5. Does bilingual students' knowledge of two languages, as measured by two standardized receptive vocabulary instruments for both languages, have a relationship with their academic performance in mathematics?
6. Do Spanish speakers in a bilingual, two-way immersion program, perform better than Spanish speakers in a traditional, English-only program on a standardized assessment of reading?
7. Do English speakers in a bilingual, two-way immersion program, perform better than English speakers in a traditional, English-only program on a standardized assessment of reading?
8. Do Spanish speakers in a bilingual, two-way immersion program, perform better than Spanish speakers in a traditional, English-only program on a standardized assessment of mathematics?
9. Do English speakers in a bilingual, two-way immersion program, perform better than English speakers in a traditional, English-only program on a standardized assessment of mathematics?

The following three chapters present findings from the research literature concerning the advantages and disadvantages of bilingual schooling, the benefits of two-way immersion programs, and other issues pertinent to the successful education of language-minority students in the public schools.

Chapter Two: True or False? Setting the Record Straight on Bilingual Education²

Last week I received another call from a parent wondering if I was interested in teaching Spanish at their school. I receive several such calls every year, despite the fact that I haven't been in the classroom (K-12) for almost a decade, from parents who want the best for their children, such as a foreign language program. However, living in an Anglo-dominant, English-majority state where persons who are bilingual are pretty uncommon, the desire for foreign language programs has outpaced the availability of teachers in my Midwestern city. The phone call/event stands in stark contrast to another common occurrence for me, the reaction of my many acquaintances and friends when they learn of my professional area of interest, bilingual education. It has puzzled me why, when people hear about a foreign language program for elementary or secondary students, they respond very positively. But when they hear about a bilingual program for Hispanic/Latino minority-language students, like the one I am involved with, they respond negatively—sometimes, even harshly. In both situations, students are developing proficiency in two languages, so why the acceptance of one and rejection of the other?

This is a hot button for many in the U.S. today—so hot in fact, that experts in the field recommend dropping the term altogether and using the less politicized term “dual language” instead. For majority-language students, such as all the English speakers who comprise 80% of the K-12 population across the country, second-language programs are typically seen at worst, as unnecessary but benign; at best, as enriching, even sophisticated.

² This chapter deviates from the *Publication Manual* of the American Psychological Association (2010) due to the nature of the professional journal to which it was submitted.

For minority-language students, however, bilingual programs are seen very negatively. In fact, sentiment against bilingual education runs so strongly that states such as California, Arizona, and Massachusetts have passed legislation banning it (Mora, 2009).

In looking at current and projected statistics, this is not an issue that is likely to fade away if we ignore it long enough. The states with the highest percentage of English learners (minority-language students) are those in the Southwest: California, Arizona, New Mexico, Texas, and their northern neighbors Oregon, Nevada, Utah, and Colorado. However, these are not the states that have experienced the greatest growth over the last ten years (1996-2006). The states that experienced a 200% increase in their language-minority population included Nebraska, Colorado, Indiana, Arkansas, Tennessee, Kentucky, Alabama, Georgia, South Carolina, North Carolina, Maryland, and New Hampshire (NCES, 2009). This means that English learner education issues are moving into states for which the debate was formerly distant or unimportant.

In this article, I present many of the common arguments, themes, and ideas surrounding bilingual education that I have heard over the years in my capacity as a teacher and researcher of bilingual education programs. As with any hot button issue, rhetoric and opinion often gets mistaken for truth. Given the poor academic performance of English learners nationally (NCES, 2010), it is time to rationally consider the facts concerning bilingual education and what really works for English learners in schools.

Bilingual Programs Result in Minority-Language Students Not Learning English Quickly Enough

One point that members from both sides of the bilingual debate can universally agree on is that English learners need to learn English. I have never met a bilingual education

teacher who did not want his or her students to learn English, and to learn it well. However, the debate is over *how* (and in what types of programs) English learners learn English most quickly. Those who oppose bilingual education, such as members of the organization English for the Children, claim “All of us share the belief that young children should be taught English as quickly as possible in American public schools. With your help, we can end bilingual education nationwide in the near future” (English for the Children, 1997).

In stark contrast to the latter statement is the overwhelming conclusion from research that English learners benefit most and attain higher levels of fluency and literacy in English when they have support and instruction in their native language (Alanis, 2000; Cook, 1990; Collier & Thomas, 2004; Cobo-Lewis, Pearson, Eilers, & Umbel, 2002a; Christian, Montone, Carranza, Lindholm, & Proctor, 1996; August & Hakuta, 1998; Danesi, 1993; Hernández, 2001; Lindholm-Leary, 2001; Ramirez, Yuen, Ramey, & Pasta, 1991; Willig, 1985; Slavin & Cheung, 2003; Thomas & Collier, 1997). While the results of this research may seem counter-intuitive, students in bilingual programs around the country are performing as well as their minority-language peers on multiple measures of achievement, despite the fact that they spend as much as half of their day in their native language (Christian, Montone, Carranza, Lindholm, & Proctor, 1996; Collier & Thomas, 2004). In fact, researchers have noted that those English learners whose native language develops to the highest levels likewise develop higher English skills (Hakuta, 1985; Cummins & Swain, 1986). In this instance, time-on-task is not a reliable predictor of eventual success. Program quality and intensity are more important, which means that it is more a function of how well and intensely teachers use the instructional time than the amount of time itself that relates to student language development.

Does this mean ALL programs for English learners must be bilingual for them to be

successful? No, not necessarily. In some cases, providing bilingual education to a linguistically diverse group of students would be beyond the capacity of most districts, especially if the district is further challenged by a lack of qualified teachers in the area. The research is clear that the most successful programs offer *support* in the native language. High quality programs exist for English learners that don't have bilingual teachers, but still allow the students to make connections and discuss concepts with peers in their native language. Such activities are beneficial in helping students make meaning of what they are learning, regardless of the subject area. Support in the native language can also make the difference between being able to connect with lessons at key points and being completely disengaged throughout. This leads to the next common objection to bilingual education.

Bilingual Education Means Changing Our Current Programs And Methods

Truthfully, the effective education of ALL students does indeed mean changing many current programs and methods in public schools. But this is no surprise to the seasoned educator. The belief that schools offer programs that are just right for every type of child is like believing that one type of car is just right for everybody's transportation needs. The fact is, one-size-fits-all doesn't fit any of us anymore, let alone language-minority students. ALL students matter in the stakes for educational success, and if we do not change what we have always been doing, it's unlikely our results will be any different. Integrating bilingual education into a school or district can be a big shift, but any change ultimately beneficial to students should be viewed as a good one. If district leaders plan adequately for a two-way immersion or other type of dual language program long-term, the transition can be fairly stress-free. Expenses are typically limited to the first years of the program for securing supplies in the target language.

The most effective programs attend to the individual needs of every child. The goal is not to have children adapt to the system, but rather have the system adapt to the child. This means a shift in how many of us see education; rather than a lock-step progression where everyone moves in unison, it is a continuous sequence by which students move at the pace most appropriate and beneficial to them, while participating in learning activities most likely to engage their interest, relate to them personally, and challenge them cognitively. For many language-minority children, bilingual education has a relevance no other educational experience would have, simply because the teacher speaks the same language they do.

Bilingual Programs Aren't American

I have always puzzled over this assertion. Why is the concept of “American” so closely tied with monolingualism? The organization English for the Children functions under its parent organization, One Nation, a name that implies a country cannot be unified if its residents speak any languages other than English (One Nation, 1997). The idea is ludicrous in Europe and other continents, where speaking more than one language is a basic fact of life (Diamond, 2010). Where I lived in Germany, in a rural and agricultural area, even students in the lowest educational track started a foreign language in second or third grade. I myself speak three languages, English being my first language. I have lived and studied abroad, and I can say without reservation that my experiences in speaking other languages has made me more proficient in English, and my experiences with other cultures have made me appreciate the United States even more. In fact, foreign language teachers are purported to be better grammarians and editors than English teachers, due to the constant comparing and contrasting across languages.

But what *is* American? Isn't what is American constantly evolving and changing? The American of the 18th Century was most likely English and spoke English. The American of the 19th Century was more likely to be German, Irish, Eastern European, or even African, and spoke a variety of different languages. Who is the typical American today? The image of the "typical" American can (and should) be different for everybody, because for most of us born here, we see ourselves as typical. Speaking English can be a unifying factor for all of us, but it isn't hindered by supporting and encouraging bilingual education.

Bilingual Programs Aren't Effective

Much of the anti-bilingual rhetoric has focused on the "complete failure" of so many past bilingual programs. Most of these claims lack any support in the research literature (Crawford, 2003). There certainly exist bilingual programs that are not effective, just as there exist other schools and programs that aren't effective. The lack of effectiveness can't be attributed to whether or not the program is bilingual; it is due to other factors that are representative of any program, such as the quality of curriculum, the effectiveness of instruction, or the alignment of curriculum with the assessments in use.

The reality is that the majority of bilingual programs are effective, as much or more effective than English-only programs (Collier & Thomas, 2004; Hernández, 2001; Lindholm-Leary, 2001; Ramirez, Yuen, Ramey, & Pasta, 1991; Willig, 1985; Slavin & Cheung, 2003; Thomas & Collier, 1997). Programs are only effective if they realize increased gains in student learning and if they meet the goals they were meant to. The goals must be reasonable and appropriate for the program; one can't arbitrarily select the goals an existing program will be held to. For example, expecting an English learner (EL) to transition into mainstream classes after only one year of Structured English Immersion is completely ludicrous, no

matter how much anybody wants it. Wanting something is not the same thing as making it possible—sitting in a garage cannot make me a car. Studying Swahili as hard as I can in an hour won't make me fluent. Program goals must themselves be verified by research. There are, however, many criteria that are appropriate for any type of program serving language-minority students. Those I would suggest include:

The program's goals are reasonable and measurable, and rationale for the program is clear.

Program goals must be measurable and reasonable, and be developed for both short-term as well as long-term priorities. Stating that all English learners will attain on-grade-level English proficiency after one year in the program is not feasible. Research indicates it takes from 4-7 years to acquire full academic proficiency in English, the proficiency needed to be successful on standardized tests, so goals must be realistic. If consideration is given to the time it takes to acquire the language necessary for success on standardized tests, it therefore becomes prudent to consider how much time it might take an English learner to attain on-grade-level academic achievement. For some skills, it may only take students only two or three years to acquire them, while others may take much longer. In addition, teachers can easily be deceived regarding students' overall language ability because of a student's deceptively high oral fluency. Some students acquire oral fluency quickly and with perfect intonation, but still struggle with reading comprehension or lack adequate academic language.

Finally, have strong rationale in place for why you want the program in the first place. What are needs that will be addressed? What are specific gaps or deficiencies in the current educational program that the program will ameliorate? How is this program more

beneficial to the targeted students than a similar program? Knowing the answers to these types of questions, and having the research to back them up, makes it easier to address questions from stakeholders that will invariably come up.

Specific academic objectives that are aligned to external assessments

The academic objectives for students in the bilingual program should be as rigorous as those for any other program. The objectives should be specific enough that teachers have a clear idea of what mastery looks like, and know when students demonstrate adequate skill or proficiency to be successful on external tests. The objectives, if aligned to external or high stakes assessments, will ensure that teachers are focusing on the concepts, skills, and knowledge students need for test success.

Language frameworks (for both languages) specify the terms, words, phrases, or grammar concepts typically learned at each level/year of the program.

The development of students' language proficiency does not happen by default. Language-minority students need direct, explicit language instruction, and teachers need guidelines for what skills and grammar concepts can typically be mastered in the given amount of time. Language frameworks keep teachers' focus on the language as much as subject-area content. Sometimes the focus is so strongly on teaching content that the need to explicitly teach language is overlooked, but even majority-language students continue to study and learn English throughout the course of their education.

Strong school-home connections exist

Home-school connections must encourage and support parental involvement, both during and outside of the school day. This may entail home visits, providing transportation to and from important school events, and sending home all notices and materials in the

parents' native language. This criterion is one that benefits all students in any program; research has consistently demonstrated that students whose parents are involved in school have higher achievement. In addition, community members and parents who are more familiar with and have spent time in their neighborhood school exhibit more positive attitudes toward their school.

Comprehensive, formative, and aligned assessments are in place with which teachers can diagnose gaps in students' learning and evaluate student progress toward mastering objectives.

Assessment is a critical part of ensuring any program's effectiveness, and it is equally critical for bilingual programs. When assessing in bilingual programs, students must be assessed with tests in their first language, as well as with tests in English, to have a balanced view of their progress. Assessing students only in English provides teachers and administrators with only part of the picture. Monolingual assessments were not designed to be used with the bilingual child (Valdes and Figueroa, 1994) and can't demonstrate students' growth in their native language—a factor which is just as important as growth in English. Assessment must be used to gauge students academic progress, assess program effectiveness, and provide teachers with diagnostic information from which they can design instruction. To serve these multiple purposes, a battery of assessments is needed in both languages.

Students are making gains commensurate with their peers.

English learners start out behind their English-dominant peers. Therefore, it is unsuitable to expect them to achieve in the first 3-5 years at similar levels. However, it is reasonable to expect them to make similar or even slightly increased gains every year, so they are at least keeping pace and eventually catching up with their language-majority peers.

The rate at which minority-language students catch up differs for every child, but it mustn't be left to chance. Leaving English learners to sink or swim in mainstream classes is a recipe for failure. Just as struggling readers need extra support in reading, struggling English speakers, readers, and writers need extra support, and lots of it, even when the English learners may not appear to require it.

The curriculum includes cross-cultural interactions

Any program serving English learners must make culture an integral focus of everyday learning, and work to build an atmosphere of appreciation and acceptance for everyone (Garcia, 2004; August & Hakuta, 1998; Thomas & Collier, 1997). To me, this is an aspect of education that is important for everyone, even language-majority students, because when your own experiences are integrated into assignments, lessons, and activities, you are able to connect to those in a more personal and meaningful way. So much of what is taught in schools appears distant and irrelevant to students because of their limited life experience, or because what they experience every day is entirely different from mainstream, middle class Anglo life. When we connect what is taught with their personal lives, even in a small way, it suddenly becomes memorable and affirming for them. However, to do this, teachers must know their students personally, and know about them, their background, their family, and their history. Teachers who do not share their students' unique backgrounds and experiences (something that is becoming more and more common) must work to connect with their students in very deliberate ways.

Conclusion

These criteria are just a few that I consider to be non-negotiable for any type of dual language or bilingual program. The bottom line is that no program is perfect, bilingual or

otherwise, and accountability should be broadly and equally applied. Bilingual education, however, can be very effective in equipping students for academic and social success. Students attain higher levels of English proficiency when supported with their native language, and benefit from the integration of culture and a personal perspective. I personally have never felt that speaking three languages was a disadvantage. For an adult, in what economic, social, or educational context is bilingualism a disadvantage? Maintaining one's native language must no longer be perceived as a threat to acquiring English; the two are mutually compatible, mutually beneficial, and worth all the effort.

Chapter Three: Language Development of Primary Students in Two-Way Immersion

Abstract

This study investigated the effects of a new, Spanish two-way immersion program on first through third grade students' English and Spanish proficiency. All students were from an urban, high-poverty community in the Midwest that is English dominant, in a predominantly Anglo state. English-speakers in the two-way immersion program score significantly higher than English speakers in an all-English program on a standardized measure of English language proficiency, while Spanish speakers in the two-way immersion score significantly higher than Spanish speakers in the all-English program on a standardized measure of Spanish proficiency. English proficiency was virtually the same across the Spanish-speaking subgroups in the two-way immersion and all-English programs. A correlation analysis of all students' Spanish-language and English-language proficiency scores revealed that only the two-way immersion Spanish-speaking students' scores on both measures were significantly related. Although sample sizes were relatively small for some subgroups, the initial results are promising regarding the benefits of two-way immersion to English speakers, and the positive relationship obtained across languages for Spanish speakers enrolled in the two-way immersion program.

Introduction

There is a crisis in U.S. education. One of every three Hispanic American³ adults in the U.S. dropped out of high school before graduating (Pew Hispanic Center, 2010), over

³ The author acknowledges that specific terms for designating ethnicity are a matter of personal preference. For this paper, in an effort to be inclusive of all Spanish-speaking and Spanish-language-heritage groups, the terms "Hispanic American," "Hispanic," and "Latino" will be used interchangeably..

one-fourth live at or below the poverty line (National Poverty Center, 2009), and Hispanic/Latino students still score below their White and non-White peers on national, norm-referenced measures of achievement such as the National Assessment of Education Progress (NAEP). Hispanic students born outside the United States are more than three times as likely to drop out of school than Hispanic students who are native born (National Center for Education Statistics, 2008). They comprise 17% of the total school-age population, yet represent over 43% of all dropouts nationally (National Center for Education Statistics, 2008).

In education, the debate persists regarding what type of program best serves Hispanic language-minority students. There are many who contend that educating Latino language-minority students in their native language as well as in English detracts from their English development and slows their academic proficiency (English for the Children, 1997). These individuals object so strenuously to bilingual education that they have sponsored legislation in multiple states to ban bilingual education permanently (English for the Children, 1997; Mora, 2009). Is learning in two languages truly detrimental to language-minority students' acquisition of English? What about language-majority students, who in the new two-way immersion program model, learn a second language alongside their language-minority peers, while maintaining their English? Are dual language programs such as two-immersion detrimental to them, as well? It is to address these questions as well as others regarding the effects of learning in two languages that this study was conceived. In the next section, the social and historical context for the study is presented in a review of pertinent research literature, followed by a more detailed description of the research questions, design, location, and participants involved in the project.

Review of Literature

Historically, bilingualism was held to be a symptom of mental inferiority. Such attitudes coincided with the early 20th Century notions of scientific racism, which proposed that Anglos (and their language) were superior mentally and physically, by reason of evolution and genetics. In education, this played out in psychology and intelligence measurement. Gutierrez states, “Strongly influenced by the racial science of the late 19th and early 20th centuries, the biological determinists in psychology sought to confirm empirically what many already suspected: that Mexicans and southern and eastern European immigrants were innately less intelligent” (2004, p. 266). As Oller and Pearson (2002) elaborated, “the claim that bilingual children of many language backgrounds show academic or intellectual deficiencies was widespread through most of the 20th century. . . . The studies . . . typically showed a correlation between bilingual status and low scores on academic or intelligence tests” (p. 5). Such an approach marginalized ethnic groups and denigrated their language and heritage, positioning bilingualism as a liability rather than an asset (Suárez-Orozco, Suárez-Orozco, & Doucet, 2004; Cummins 1981; Cummins, 1984) and perpetuating the cultural deficiency model ascribed to immigrants and other ethnically diverse groups (Bialystok, 2008; Umbel, Pearson, Fernández, & Oller, 1992).

Bilingualism: Advantage or Disadvantage?

A shift among some researchers in how bilingualism was perceived occurred in the early 1960s. Two publications are notable in their departure from the commonly-held negative views of bilingualism: *Thought and Language*, by Vygotsky (1962), and a groundbreaking article by Peal and Lambert (1962). In his book, Vygotsky (1962) lays the groundwork for viewing bilingualism and the deliberate acquisition of a second language as a

cognitively enriching experience and skill. Peal and Lambert's (1962) landmark study sought to determine the nature of the effect of bilingualism on intelligence. They tested 10-year old Canadian children enrolled in parochial French immersion schools using multiple measures of intelligence, verbal and nonverbal, and found that bilingual students' intelligence was superior to monolingual children when controlling for socio-economic status. The study is even more unique, given the fact that Peal and Lambert directly addressed the need to control for intervening variables such as socioeconomic status and test bias, and they noted the methodological weakness of the majority of the studies on bilingualism conducted prior to 1960 (1962).

Thereafter followed more research studies that demonstrated distinct advantages for bilinguals and yet others showing disadvantages. Researchers concluded, in the face of these apparently contradictory findings, that it may be the position of the bilingual in a societal context with respect to the dominant culture and language that determines a positive or negative impact on their test performance (Cummins, 1981; Cummins & Swain, 1986). In other words, it is the bilingual's social circumstance, as a member of the dominant culture or as an outsider, that influences bilinguals' test performance more than their language proficiency, alone. As Cummins and Swain describe it, "many of the negative studies involved bilingual students from minority language groups whose L1 was gradually being replaced by a more prestigious L2" (p. 18). Lambert (cited in Cummins & Swain, 1986) described this situation as "subtractive bilingualism," due to the circumstance of the new (dominant) language replacing the first. Positive studies regarding the benefits of bilingualism for members of the dominant culture abound. Caccavale (2007) reports in a synthesis of findings from multiple studies that elementary students (from the dominant

culture) who study a foreign language score significantly higher on all subtests of standardized achievement tests than do those who are not involved in second language study.

Minority Status Issues

Many of the research studies conducted in the first half of the 20th century are flawed for reasons deriving from the minority status of English learners: IQ tests that were developed for monolingual populations of a particular (dominant) culture and class were used around the globe with low-income, bilingual students representing a minority culture (Peal & Lambert, 1962; Saer, 1923). Hence, minority-language students were equipped with neither the cultural capital nor the linguistic proficiency a majority-language student would possess. Tests of intelligence were misused with bilingual students, particularly since vocabulary knowledge plays such an important role in verbal IQ tests (Cummins, 1981) and English learners lack this commodity—but not due to cognitive deficiency. Lack of vocabulary knowledge can be attributed to socio-economic status more than to any other characteristic (Farkas, & Beron, 2004; Hart & Risley, 2003; Walker, Greenwood, Hart, & Carta, 1994). The percentage of Hispanic families in poverty exceeds that of non-Hispanic Whites by over fifteen percentage points (25% compared to less than 10%); about nineteen percent of all language-minority families are in poverty, compared to the national rate of native-born U.S. citizens, at just under fourteen percent (National Poverty Center, 2009).

As with other areas of educational research concerned with student achievement and outcomes, socioeconomic status itself can confound results if not carefully controlled. In fact, with immigrant and English learner student achievement, the majority of assessed deficiencies can be explained by low income, a factor long known to impact student performance on standardized assessments and vocabulary measures (Oller & Pearson, 2002;

Peal & Lambert, 1962). In conducting research regarding the size of vocabularies of children, Hart and Risley (2003) found that the vocabulary of low-socioeconomic status (SES) children lags substantially behind mid to high-SES children. This difference can be found as early as 36 months of age (2003). Limited vocabulary knowledge, due to socioeconomic status, lack of English proficiency, or both, has resulted in the over-identification of English learners for special education (Figueroa, 2005; Oller & Pearson, 2002; Valdés & Figueroa, 1992).

The issues surrounding bilingualism, however, are more complicated than proving it to be an asset or a detriment. If learning a second language is beneficial to language-majority students, why is it not as obviously beneficial for language-minority students, as well? The latter question is essential in the quest to improve education for language-minority students. These students come to school with a different language than the one taught in U.S. public schools—learning a second language, for these children, is not a choice. Valdés and Figueroa (1992) call this type of bilingualism “circumstantial,” while the bilingualism of language-majority students can be considered “elective.” Beyond the circumstantial nature of Latino language-minority students’ bilingualism, most are acquiring English in subtractive⁴, English-only environments rather than additive ones (Wiley & Lukes, 1996), despite clear research findings that demonstrate that English learners benefit most and attain higher levels of fluency and literacy when they have support and instruction in their native language (Alanis, 2000; August & Hakuta, 1998; Cobo-Lewis, Pearson, Eilers, & Umbel, 2002a; Christian, Montone, Carranza, Lindholm, & Proctor, 1996; Collier & Thomas, 2004; Cook, 1990; Danesi, 1993; Hernández, 2001; Lindholm-Leary, 2001; Ramirez, Yuen,

⁴ “Subtractive” refers to an environment where the dominant language, English, is *replacing* the native language, rather than being added to it.

Ramey, & Pasta, 1991; Slavin & Cheung, 2003; Thomas & Collier, 1997; Willig, 1985).

While the research base supporting some form of bilingual education for language-minority students is well established, there remain gaps in research concerning how bilingualism and bilingual education, such as two-way immersion programs, impact both language-minority and language-majority students. The following section discusses theory concerning the symbiotic nature of bilinguals' language development.

Theoretical context of the study

The importance of theory in conducting and interpreting research is key; when educators better understand the cognitive functioning of the bilingual brain and how bilingualism specifically impacts students' cognition and their academic performance, this knowledge can then guide instructional decision making and policy, with the intent to better serve language-minority students. Theories are critical, however, in making sense of the endless streams of empirical information, sometimes contradictory, that research studies provide. As Cummins (1999) describes it, theory provides a lens through which evidence is examined. A fuzzy lens results in weaker conclusions, and prevents the effective synthesis of multiple sources of data. He states, "without a theoretical framework for conceptualizing these relationships, legitimate empirical questions cannot even be asked" (1984, p. 16). Theory not only suggests relationships among the various components and issues of bilingualism, it also helps define them more clearly (Cummins, 1984).

One major theory that is discussed in this section relates to Vygotsky's (1962) suggested ideas regarding concept formation and the link between language and thought in children. Vygotsky (1962) posits that bilingualism must result in greater conceptual awareness and concept attainment (Cummins & Swain, 1986; Lambert, 1977). He states,

“The child can transfer to the new language the system of meanings he already possesses in his own” (p. 110). This idea of transfer across languages is a critical component of and rationale for bilingual education of any kind—and one that stands in direct opposition to English-only ideology (Rolstad, Mahoney, & Glass, 2005; Wiley & Lukes, 1996).

Cummins’ theory relates to the idea of transfer across languages and the interdependence of all languages that a person acquires. Cummins (1984) developed and refined the language interdependence theory, something he calls “common underlying proficiency,” to suggest an explanation of how and why language-minority and language-majority students developing bilingual skills can demonstrate such different performance on academic measures. Understanding why language-majority students in French immersion programs do so well in school and on IQ measurements (Peal & Lambert, 1962) and language-minority students do so poorly, comparatively, in English immersion programs in the U.S. is important if educators want to better serve underperforming student groups. Cummins’ language interdependence theory (1984) is predicated on the notion that language proficiency can be categorized into two main classifications: basic interpersonal communication skills (BICS), and cognitive/academic language proficiency (CALP). These two classifications make a distinction about the demands for language production that are placed on speakers every day, and more importantly, on second-language learners. BICS represent those language skills that are less cognitively demanding and more automatic for native language speakers, and they typically take place in a social, interpersonal context. These skills, therefore, are highly contextualized and responsive to input and feedback from listeners and situational cues. By contrast, CALP skills are more cognitively demanding and less context-dependent. Such skills are at play in the classroom, particularly when language

is not supported by concrete referents or context clues (think of a picture book, where pictures provide a context for understanding the text). In Cummins' theory, classroom or academic language represents the greatest challenge to a second-language learner, since the language is more abstract and the context does not provide the listener with clues as to meaning and significance (Cummins & Swain, 1986). This is true both in listening and reading. These two classifications are placed on intersecting continua: the cognitive demand of language, either L1 or L2, and the context embeddedness of communication, either L1 or L2. The graphic is depicted in Figure 1 (p. 153).

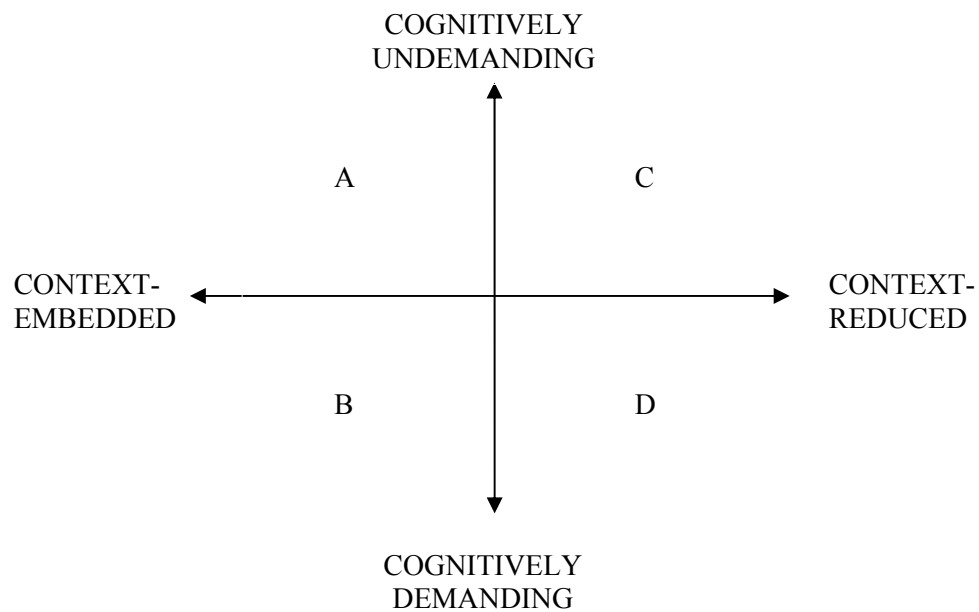


Figure 1

Depending on the nature and demands of communication, students move from one quadrant (A, B, C, or D) to another when functioning in either L1 or L2. The same task in each language may place a student in two different quadrants, depending on the student's proficiency level. Each child will function in his or her respective languages uniquely, allowing for individual differentiation in linguistic competence, and as the depiction of the

relationship of the demands of communication in Figure 1 are independent of the distinct languages, it supports Cummins' (1984) idea that cognitive processing and contextual positioning of communication circumscribes any or all of a child's languages. This leads to a critical component of Cummins' theory, that the functioning and cognitive processing of either language are interdependent (1984). He postulates that there is a common underlying proficiency that allows students to acquire concepts and knowledge in one language and exercise that knowledge in the other (1984).

Such language interdependence lies at the heart of bilingual education. If such interdependence did not exist, then students in immersion programs who learn to count and add in French would be unable to do so in English. Several studies, however, support the notion that certain concepts—not discrete words, since vocabulary is a different skill that must be learned in most cases by rote—learned in one language transfer into the other (Durgunoğlu, 1993). This theory is key in understanding why support in the native language assists language-minority students in acquiring stronger English skills (Garcia, 1993). López and Tashakkori (2006) found that students with low-levels of English proficiency acquired higher levels of oral proficiency in English when provided with more native language support—L1 development fostered higher achievement in L2. Hakuta (1985) observed that there is an increasing correlation between the abilities of children in two languages over time, reaching correlations up to $r = .70$. He also found that children who came in with a strong first language ended up with stronger L2, or English, skills.

Vocabulary development in bilinguals

Regarding vocabulary size, bilinguals typically have smaller vocabulary sizes in each respective language, when compared to the single-language vocabulary size of a monolingual

(Pearson & Fernández, 1994). All other aspects of vocabulary growth and development among bilinguals and monolinguals are similar, including the age of onset for vocabulary development (Doyle, Champagne, & Segalowitz, 1977; Pearson & Fernández, 1994). In their study of bilingual infants and toddlers, Pearson and Fernández (1994) found a “growth spurt” in language among the children, similar to that of monolingual children ages 8 to 30 months, and the spurts occurred at sporadic, uneven rates, most often sequentially rather than simultaneously. Pearson and Fernández (1994) concluded that every possible relationship that can exist between two languages in fact does, more even than can be demonstrated by the 20 children they evaluated over a two-year period.

In another study conducted by Doyle, Champagne, and Segalowitz (1977) with balanced bilinguals and monolinguals ages 30 to 51 months, the bilingual children appeared to lag slightly in the acquisition of lexical items (vocabulary size), but when given pictures to describe, appeared to be superior in ideational, or conceptual, fluency. When vocabulary sizes are combined across languages, bilinguals’ vocabulary size is equal to or greater than that of monolinguals (Umbel, Pearson, Fernández, & Oller, 1992). However, the limitations of monolingual assessment instruments fail to demonstrate the entirety of bilingual lexical knowledge (Valdés & Figueroa, 1994).

Relevance of this Research Study

Cummins’ (1984) theory, in conjunction with the evidence from other research studies summarized here, provides the reader with additional insight into the philosophy and unique approach of two-way immersion programs. Such programs, in deliberately integrating language-minority and language-majority students, seek to overcome the cultural and linguistic isolation experienced by so many immigrant and language-minority students,

and to equip the students with strong cross-cultural appreciation and skills (Collier & Thomas, 2004; Garcia, 1993; Suárez-Orozco, Suárez-Orozco, & Doucet, 2004; Thomas & Collier, 1997). Two-way immersion programs level the playing field for students of all backgrounds and maximize their opportunities to compare and contrast two language systems in a contextually comprehensible and supportive environment. In an additive bilingual environment such as two-way immersion classrooms, second-language (L2) learning does not encroach on the heritage language (Umbel, Pearson, Fernández, & Oller, 1992). English learners have the support they need in their native language, and literacy can be acquired by all students in both languages at the same time (at different times of the day), something Slavin and Cheung (2003) have found to be particularly beneficial. And the fewest dropouts come from one- and two-way immersion programs (Thomas & Collier, 2002). Clearly, two-way immersion programs offer real promise to underachieving Hispanic English learners in the U.S.

Educators and policy-makers have a need to understand more clearly the effect that learning in a bilingual environment has on majority-language and minority-language students' developing language skills, to augment what we already know about the benefits of two-way immersion in building self-esteem, cross-cultural awareness, and in capitalizing on inter-language transfer. Such an approach is rooted in the belief that cross-language comparison and analysis will be ultimately beneficial for every child, regardless of their majority or minority status, beyond their ability to converse and interact in two languages. Empirical evidence is needed that minority students' developing bilingualism, in this particular context, is as beneficial to them as it is to dominant-language students in overall language proficiency development. Toward that end, this quantitative research study was

designed to carefully evaluate students' receptive vocabulary, one type of measure of language proficiency, for both language-minority and language-majority students in the two-way immersion program, and compare the results with those of students in the control school, who experienced only English.

Background and Context of Study

This study was part of a larger research grant project undertaken by the National K-12 Foreign Language Resource Center (NFLRC), in cooperation with the Iowa Department of Education (DE). The grant project overseen and funded by the NFLRC involved collecting a vast array of longitudinal data from students, parents, teachers, administrators, and community members concerning attitudes, beliefs, and responses to Spanish two-way immersion (TWI) programs over a four-year period. The 2006-07 school year represented the first of the four-year TWI project. Although funding had been secured for four years, the project was intended to ultimately span eight full years with renewed funding.

In 2005, the State of Iowa had two programs in existence that were considered Spanish two-way immersion (TWI) programs (K-5), and several districts had expressed interest in the program model as a means to better serve rapidly growing ELL populations. The consultant at the Iowa Department of Education (DE) for English as a Second Language had been successful in securing grant funding for two additional public school districts to establish a two-way immersion program in the state of Iowa, and the treatment school for this project was one of the elementary schools awarded these start-up funds. The National K-12 Foreign Language Resource Center (NFLRC) was invited to collaborate on the project and conduct research concerning all possible benefits and outcomes of the new two-way immersion program. The NFLRC applied for funding from the U.S. Department of

Education in 2005⁵ and was granted funding in August of 2006.

In her capacity as research assistant at the NFLRC, the researcher also served as a TWI consultant for the schools involved in the four-year research project. The researcher made several trips to both elementary schools involved in the project each year, along with other members of the NFLRC research team, to act as advisor to program teachers and administrators; and to administer assessments and surveys to the students, parents, teachers, and school staff of both TWI and control schools. The researcher was trained in administering the different assessments for the comprehensive project with other members of the NFLRC research team. All members of the team participated in practice sessions for administering the various assessments and compared assessment results to determine inter-rater reliability. Team members shared the responsibility for administering assessments in Spanish and English to all the students involved in the project over the four-year period.

Research Design

A quasi-experimental research design was selected for the four-year project. In this context, the “treatment” was the two-way immersion program first implemented in 2006, in a newly built, large (700+ students), urban elementary school with high poverty and traditionally low academic achievement. A second elementary school within the district that was most similar to the treatment school in population demographics such as economic status, type of neighborhood, home languages, and ethnicity, was selected to serve as a control school. This school is very similar to the treatment school except that the control school has no two-way immersion, dual language, or world language program. All instruction was delivered in English.

⁵ This project was supported with funding from the U.S. Department of Education, Office of Postsecondary Education, Center for International Education, under grant number P229A060013-07 to Iowa State University.

This design allowed not only for the collection of repeated-measures data over time, but also a comparative analysis of treatment school and control school data.

Two-way immersion (TWI) programs are a type of dual-language program that provides instruction to a student body representative of both language-minority (Spanish-speaking) and language-majority (English-speaking) students. Serious efforts were made to maintain the balance between students' languages at 50%-50%, although lack of familiarity with the new TWI program and student attrition resulted in a balance of 70%-30% across languages in the first two cohorts (with Spanish spoken by the majority of the students).

The two-way immersion (TWI) program at the treatment school began in kindergarten at the beginning of the 2006-07 school year. Two teachers, both bilingual, were selected to teach in the TWI program. One was an experienced kindergarten teacher while the other, a pull-out English as a second language (ESL) teacher, had no classroom teaching experience. One taught all day in Spanish while the other taught in English; the teachers shared their two classes of students so that all students received a 50-50% balance of Spanish and English throughout the day. This model was continued throughout the grades as the program progressed: one teacher was hired to teach all day, every day in Spanish, and another teacher, usually an English monolingual already on staff and familiar with the school and curriculum, was selected to teach in English, and both teachers taught a mixed group of Spanish speaking and English speaking students. Teachers taught in their respective language to student populations of mixed languages (Spanish and English).

Both the treatment and control schools used similar materials and the same district curriculum, and students in the two-way immersion strand at the treatment school were held to the same standards as other students at their grade level. In both schools, literacy was

taught using a balanced approach. The balanced literacy approach is characterized by balancing instruction across the four different support levels for reading, which fall along a continuum of most to least dependent. These four types of reading include: read-aloud, the most student-dependent form of reading takes place when the teacher reads aloud to the students from a text only the teacher can see; shared reading, where the teacher reads aloud with the students from a text all can see (such as a big book); guided reading, where students are reading independently and out loud in a small group with high levels of support (and even instruction) from the teacher; and independent or sustained silent reading, where the student reads to himself or herself, independently. In the TWI program, a balanced literacy approach was used in both languages, although phonics, concepts of print, and grammar-based language skills are taught according to the unique syntax and morphology of each language. This means that concepts and skills that are specific to each language are taught only in that language, as is both appropriate and authentic.

Research Questions

The research questions for this study used the standardized receptive vocabulary instruments in both English and Spanish as the dependent variable. The questions are:

1. Do English speakers in a Spanish TWI program have better English proficiency when compared to English speakers in a traditional, English-only program, as measured by a standardized receptive vocabulary assessment in English?
2. Do Spanish-speaking English learners in a Spanish TWI program have better English proficiency when compared to Spanish-speaking English learners in a traditional, English-only program, as measured by a standardized receptive vocabulary assessment in English?

3. Do Spanish-speaking English learners in a Spanish TWI program have better Spanish proficiency when compared to Spanish-speaking English learners in a traditional, English-only program, as measured by a standardized receptive vocabulary assessment in Spanish?

To answer these questions, the researcher and her colleagues followed the procedures described in the next section.

Methodology

The TWI program began in fall 2006 in kindergarten and a grade level was added every year, with the goal of spanning K-5 by the end of the 2011-12 school year. All students enrolled in the TWI program and at the control school were invited to participate in the study, beginning with kindergarteners in 2006-07 and concluding with grades K-3 in 2009-2010. Parents were asked to sign consent forms⁶ (provided in Spanish and English) if they wished their child to be included. The response rate (for both affirmative and negative responses) in the treatment school remained around 95-100% for all four years, while the rate at the control school remained around 70-80% each year. Most parents granted consent for their child to be involved in the study. In addition to testing the students in the TWI program and at the control school with English and Spanish standardized vocabulary measures, a variety of other information was collected as well, including their ethnicity, gender, home language, year of entry into the school/program, and birth date. Data from district-administered assessments were also collected. Income information was only available by grade level, not by individual, but the researcher determined the percentage of students who qualified for free or reduced-price lunch to be equal in both buildings, and that percentage

⁶ Consent forms approved by the Institutional Review Board. Project IRB approval number 06-381.

exceeded ninety percent of the population in both buildings.

No random sampling or random assignment was used to identify the treatment or control groups. Involvement in the TWI program was voluntary. Except for two students, every student in the TWI program was a neighborhood child, just as every student at the control school was a neighborhood child, and all were well-matched on demographic factors, particularly socio-economic status. One issue, however, that did arise was the number of newly-arrived English learners who enrolled in the TWI program at the treatment school each year. As the program lost students, whether English-speaking or Spanish-speaking, they were replaced with students who spoke Spanish. Many of these students had few or no English skills, as is common with most newcomers. New students were added to the control school sample, as well; however, the attrition of English speakers from the TWI program and the lack of parental consent from Spanish speakers at the control school resulted in the proportion of Spanish speakers at the treatment school exceeding the proportion of Spanish speakers in the control school by almost two to one at the conclusion of the fourth year (see Analysis and Discussion).

Instrument

The Peabody Picture Vocabulary Test-III (PPVT) (Dunn & Dunn, 1986) was used to measure English proficiency. This assessment has a long history and high validity (Millett, Atwill, & Blanchard, 2008; Uchikoshi, 2006). Repeated studies have shown a high degree of consistency in the measurement of PPVT scores, and the median alpha reliability for Form IIIB is .95 (Williams & Wang, 1997). Validity of the test has been established by correlations with other tests of vocabulary knowledge and evidenced by the manner in which test items were developed (Williams & Wang, 1997). The PPVT Form IIIB has been used in

other studies as a measure of language proficiency (Uchikoshi, 2006; Umbel, Pearson, Fernández, & Oller, 1992) and is considered one of the most reliable in the field of language measurement (Williams & Wang, 1997). The Peabody Picture Vocabulary Test (PPVT) has a Spanish language version, called the Test de Vocabulario en Imágenes Peabody (TVIP) (Dunn, Luga, & Dunn, 1986). This test was used as the standardized Spanish proficiency assessment.

Both the PPVT and the TVIP are measures of receptive vocabulary; in other words, students are presented with four pictures grouped together on a page. The test administrator states a word, without any definite or indefinite article, and the student points to the picture that corresponds to that word. The tests are designed for use with children age 2.5 to adults age 90; the PPVT is normed against an English-speaking, monolingual, U.S.-based sample, while the TVIP is normed against three different Spanish-speaking monolingual populations (test administrators can select which population norms to use in calculating percentiles). The three populations are from Puerto Rico, Mexico, or Spain. For this study, Mexico norms were used, as most of the student population in the treatment and control schools were of Mexican heritage.

Assessment procedures

The PPVT and TVIP tests were scored similarly. For each student, a base and a ceiling were established for the vocabulary knowledge, and a raw score was computed from the number of responses the child had correct. Based on the child's chronological age, a standard score was computed from the test administrator's booklet, from which the national percentile rank, norm curve equivalent score, stanine, and national grade equivalent were computed. The researcher used the national percentile rankings to compare student

performance across sub-groups. Students were all tested in the spring of the year, in first grade and above, over a three-year period from 2008-2010.

Analysis and Discussion

In analyzing the data, the samples from the treatment and control school were treated separately to allow for comparison across the two groups. PPVT and TVIP test scores serve as the dependent variable in every test; the independent variables that may have an effect on the PPVT and TVIP scores were entered into a generalized linear model to see if any of the effects were significant. The independent variables included home language, meant to represent the student's dominant or first language, ethnicity, school, number of years in the program, and gender. The total sample size was 304 students in grades K-3. Ethnicity was originally five separate classifications, but due to the small number of students who were not Hispanic or White, the three remaining ethnic groups were classified under the term, "other." Table 1 summarizes the descriptive statistics for the entire sample of students tested with the PPVT during the 2009-10 school year..

Table 1

Descriptive Statistics for Independent Variables by School

| School | Ethnicity | | | Home Language | | Gender | | Yrs. In Program | | | | TOTAL |
|-----------|-----------|----------|-------|---------------|---------|--------|--------|-----------------|----|----|----|-------|
| | White | Hispanic | Other | English | Spanish | Male | Female | 4 | 3 | 2 | 1 | |
| Treatment | 37 | 117 | 12 | 41 | 125 | 81 | 95 | 23 | 31 | 50 | 62 | 166 |
| Control | 40 | 62 | 36 | 73 | 65 | 60 | 78 | 22 | 22 | 44 | 50 | 138 |

Table 2 displays the descriptive statistics for overall performance, by school, on the PPVT at the end of the 2009-10 school year.

Table 2**Descriptive Statistics for PPVT Percentile Rank by School, Home Language, Gender, and Ethnicity**

| Treatment School (Total n = 166) | | | | | | | |
|---|-------------|----------------|----|---------------|----------------|--------|----|
| Home Language: English | | | | | | | |
| | Male | | | Female | | | |
| | Mean | Std. Deviation | n | Mean | Std. Deviation | n | |
| White | 63.625 | 30.729 | 8 | White | 63.167 | 15.225 | 12 |
| Hispanic | 45.833 | 20.566 | 6 | Hispanic | 31.000 | 17.550 | 5 |
| Other | 35.667 | 11.372 | 3 | Other | 44.143 | 26.067 | 7 |
| Total | 52.412 | 26.327 | 17 | Total | 50.917 | 22.807 | 24 |
| Home Language: Spanish | | | | | | | |
| | Male | | | Female | | | |
| | Mean | Std. Deviation | n | Mean | Std. Deviation | n | |
| White | 27.852 | 25.933 | 6 | White | 21.364 | 18.570 | 11 |
| Hispanic | 27.084 | 16.885 | 49 | Hispanic | 20.742 | 17.754 | 57 |
| Other | 12.000 | 15.556 | 2 | | | | |
| Total | 26.635 | 17.797 | 57 | Total | 20.843 | 17.747 | 68 |
| Control School (Total n = 138) | | | | | | | |
| Home Language: English | | | | | | | |
| | Male | | | Female | | | |
| | Mean | Std. Deviation | n | Mean | Std. Deviation | n | |
| White | 35.091 | 23.364 | 11 | White | 47.333 | 28.781 | 21 |
| Hispanic | 51.750 | 13.048 | 4 | Hispanic | 51.833 | 28.003 | 6 |
| Other | 41.411 | 27.392 | 18 | Other | 38.385 | 27.960 | 13 |
| Total | 40.558 | 24.728 | 33 | Total | 45.100 | 28.117 | 40 |
| Home Language: Spanish | | | | | | | |
| | Male | | | Female | | | |
| | Mean | Std. Deviation | n | Mean | Std. Deviation | n | |
| White | 40.500 | 22.472 | 4 | White | 19.050 | 13.447 | 4 |
| Hispanic | 30.443 | 26.577 | 21 | Hispanic | 22.071 | 19.704 | 31 |
| Other | 25.000 | 28.284 | 2 | Other | 31.667 | 15.503 | 3 |
| Total | 31.530 | 25.475 | 27 | Total | 22.511 | 18.727 | 38 |

Table 3 displays the descriptive statistics for overall performance on the TVIP at the end of the 2009-10 school year. Mean scores in both tables are means of percentile ranks.

Totals in Table 2 may not agree with the totals in Table 3 because not all the students tested with the PPVT were tested with the TVIP, due to absence.

Table 3

Descriptive Statistics for TVIP Percentile Rank by School, Home Language, Gender, and Ethnicity

| Treatment School (Total n = 164) | | | | | | | |
|---|--------|----------------|----|----------|----------------|--------|----|
| Home Language: English | | | | | | | |
| | Male | | | Female | | | |
| | Mean | Std. Deviation | n | Mean | Std. Deviation | n | |
| White | 19.329 | 31.759 | 7 | White | 6.367 | 12.014 | 12 |
| Hispanic | 24.333 | 28.647 | 6 | Hispanic | 6.460 | 14.277 | 5 |
| Other | 7.667 | 6.110 | 3 | Other | 0.773 | 1.465 | 7 |
| Total | 19.019 | 26.816 | 16 | Total | 4.755 | 10.576 | 24 |
| Home Language: Spanish | | | | | | | |
| | Male | | | Female | | | |
| | Mean | Std. Deviation | n | Mean | Std. Deviation | n | |
| White | 18.000 | 23.117 | 6 | White | 39.000 | 19.677 | 11 |
| Hispanic | 31.267 | 25.696 | 49 | Hispanic | 39.321 | 28.097 | 56 |
| Other | 23.550 | 33.163 | 2 | | | | |
| Total | 29.600 | 25.524 | 57 | Total | 39.269 | 26.768 | 67 |
| Control School (Total n = 54) | | | | | | | |
| Home Language: Spanish* | | | | | | | |
| | Male | | | Female | | | |
| | Mean | Std. Deviation | n | Mean | Std. Deviation | n | |
| White | 1.050 | 1.096 | 4 | White | 10.333 | 9.238 | 3 |
| Hispanic | 27.842 | 31.797 | 17 | Hispanic | 33.790 | 29.585 | 27 |
| Other | 9.000 | . | 1 | Other | 47.505 | 67.168 | 2 |
| Total | 22.114 | 29.829 | 22 | Total | 32.448 | 30.800 | 32 |

*Note that English speakers in the control school were not assessed with the TVIP, as they are not involved in a TWI program.

In examining the PPVT and TVIP test scores, the independent variables that might affect both treatment and control students' PPVT and TVIP scores were tested using a univariate analysis of variance (UNIANOVA). The UNIANOVA facilitated an examination

of the difference between students' mean scores by categories of each independent variable, as well as of the interactions of two or three independent variables. The UNIANOVA included all students involved in the study at both schools. The UNIANOVA tests whether the difference among mean PPVT or TVIP scores within the subgroups for each independent variable is significant. Therefore, for the independent variable school, there are two categories: treatment and control. The UNIANOVA tests whether the mean PPVT or TVIP percentile ranks for students in the treatment school are significantly different from students in the control school. Likewise for home language, the UNIANOVA tests whether there is a significant difference between mean PPVT or TVIP scores between English speakers and Spanish speakers. The value used for significance is $p < .05$. Tables 4 and 5 present the results of the UNIANOVA for the PPVT and the TVIP, respectively.

Table 4**UNIANOVA Tests of Between-Subjects Effects, PPVT Percentile Rank 2009-10**

| Source | Statistics | | | | | | | |
|---|-------------------------|-----|-------------|--------|------|---------------------|--------------------|-----------------------------|
| | Type III Sum of Squares | df | Mean Square | F | p | Partial Eta Squared | Noncent. Parameter | Observed Power ^b |
| Corrected Model | 52650.148 ^a | 27 | 1950.005 | 4.233 | .000 | .290 | 114.288 | 1.000 |
| Intercept | 2316.801 | 1 | 2316.801 | 5.029 | .026 | .018 | 5.029 | .608 |
| PPVT Chron. age | 124.859 | 1 | 124.859 | .271 | .603 | .001 | .271 | .081 |
| Years in the program | 1693.045 | 1 | 1693.045 | 3.675 | .056 | .013 | 3.675 | .480 |
| School | 816.981 | 1 | 816.981 | 1.773 | .184 | .006 | 1.773 | .264 |
| Home Language | 9400.078 | 2 | 4700.039 | 10.202 | .000 | .068 | 20.405 | .986 |
| Gender | 187.347 | 1 | 187.347 | .407 | .524 | .001 | .407 | .097 |
| Ethnicity | 1039.444 | 2 | 519.722 | 1.128 | .325 | .008 | 2.256 | .248 |
| School * Home Language | 1191.849 | 2 | 595.925 | 1.294 | .276 | .009 | 2.587 | .279 |
| School * Gender | 28.651 | 1 | 28.651 | .062 | .803 | .000 | .062 | .057 |
| School * Ethnicity | 2321.275 | 2 | 1160.637 | 2.519 | .082 | .018 | 5.039 | .502 |
| Home Language * Gender | 383.116 | 2 | 191.558 | .416 | .660 | .003 | .832 | .117 |
| Home Language * Ethnicity | 443.993 | 2 | 221.997 | .482 | .618 | .003 | .964 | .129 |
| Gender * Ethnicity | 707.006 | 2 | 353.503 | .767 | .465 | .005 | 1.535 | .180 |
| School * Home Language * Gender | 864.392 | 1 | 864.392 | 1.876 | .172 | .007 | 1.876 | .276 |
| School * Home Language * Ethnicity | 2394.229 | 2 | 1197.115 | 2.599 | .076 | .018 | 5.197 | .516 |
| School * Gender * Ethnicity | 474.245 | 2 | 237.122 | .515 | .598 | .004 | 1.029 | .134 |
| Home Language * Gender * Ethnicity | 1089.187 | 2 | 544.594 | 1.182 | .308 | .008 | 2.364 | .258 |
| School * Home Language * Gender * Ethnicity | 136.177 | 1 | 136.177 | .296 | .587 | .001 | .296 | .084 |
| Error | 128990.600 | 280 | 460.681 | | | | | |
| Total | 507200.440 | 308 | | | | | | |
| Corrected Total | 181640.748 | 307 | | | | | | |

a. R Squared = .290 (Adjusted R Squared = .221)

b. Computed using alpha = .05

The independent variable home language ($p < .000$) showed significant variance; English and Spanish speakers' PPVT scores are significantly different. This is no surprise, given that the PPVT is a measure of receptive language proficiency. There are marginally

significant differences ($p < .056$) in PPVT scores among student subgroups, classified by the number of years they have been in the TWI or English-only program. This is again not surprising, since students are expected to improve language proficiency over time.

Table 5**UNIANOVA Tests of Between-Subjects Effects, TVIP Percentile Rank 2009-10**

| Source | Statistics | | | | | | | |
|---|-------------------------|-----|-------------|-------|------|---------------------|--------------------|-----------------------------|
| | Type III Sum of Squares | df | Mean Square | F | p | Partial Eta Squared | Noncent. Parameter | Observed Power ^b |
| Corrected Model | 33017.737 | 19 | 1737.776 | 2.520 | .001 | .193 | 47.878 | .996 |
| Intercept | 1095.796 | 1 | 1095.796 | 1.589 | .209 | .008 | 1.589 | .241 |
| PPVT Chron. age | 123.812 | 1 | 123.812 | .180 | .672 | .001 | .180 | .071 |
| Years in the program | 956.446 | 1 | 956.446 | 1.387 | .240 | .007 | 1.387 | .216 |
| School | 1734.004 | 1 | 1734.004 | 2.514 | .114 | .012 | 2.514 | .351 |
| Home Language | 5221.688 | 2 | 2610.844 | 3.786 | .024 | .036 | 7.572 | .685 |
| Gender | 460.094 | 1 | 460.094 | .667 | .415 | .003 | .667 | .128 |
| Ethnicity | 2846.303 | 2 | 1423.151 | 2.064 | .130 | .020 | 4.127 | .421 |
| School * Home Language | .000 | 0 | . | . | . | .000 | .000 | . |
| School * Gender | 213.868 | 1 | 213.868 | .310 | .578 | .002 | .310 | .086 |
| School * Ethnicity | 1572.752 | 2 | 786.376 | 1.140 | .322 | .011 | 2.281 | .249 |
| Home Language * Gender | 4177.754 | 1 | 4177.754 | 6.058 | .015 | .029 | 6.058 | .688 |
| Home Language * Ethnicity | 174.308 | 2 | 87.154 | .126 | .881 | .001 | .253 | .069 |
| Gender * Ethnicity | 870.751 | 2 | 435.376 | .631 | .533 | .006 | 1.263 | .155 |
| School * Home Language * Gender | .000 | 0 | . | . | . | .000 | .000 | . |
| School * Home Language * Ethnicity | .000 | 0 | . | . | . | .000 | .000 | . |
| School * Gender * Ethnicity | 78.616 | 1 | 78.616 | .114 | .736 | .001 | .114 | .063 |
| Home Language * Gender * Ethnicity | 105.996 | 1 | 105.996 | .154 | .695 | .001 | .154 | .068 |
| School * Home Language * Gender * Ethnicity | .000 | 0 | . | . | . | .000 | .000 | . |
| Error | 137923.475 | 200 | 689.617 | | | | | |
| Total | 349268.751 | 220 | | | | | | |
| Corrected Total | 170941.211 | 219 | | | | | | |

a. R Squared = .193 (Adjusted R Squared = .117)

b. Computed using alpha = .05

There were no significant differences among students' PPVT scores for any of the other independent variables, including the interaction effects of two or more variables. Similar results were found for the students' performance on the TVIP, which are presented in Table 5.

As with the first model estimated with PPVT percentile rank as the dependent variable, the UNIANOVA results show that there are significant differences among home language subgroups' performance on the TVIP ($p < .024$). Interaction effects with school and home language were not possible to estimate, since English speakers at the control school did not participate in TVIP testing.

The main research questions for this study concerned comparing performance of students within a particular language group across the two schools, control and treatment. The UNIANOVA tests confirm the logic of this approach: home language is the single variable by which students' performance on the PPVT and TVIP differs significantly ($p < .05$). Comparing English speakers of either school with Spanish speakers would always yield a significant result; therefore comparisons should be made within language groups across schools to determine if the TWI program is having an effect. Subsequent to the UNIANOVA tests and to directly test the hypothesis posed by the three main research questions for this study, an analysis of variance (ANOVA) was performed while keeping student subgroups for each school and home language groups separate (using the split file function in SPSS). This allows for a comparison of means within home language subgroups across schools. Three separate ANOVA models were estimated comparing the performance of Spanish speakers at the control school with Spanish speakers at the treatment school on the PPVT and the TVIP, respectively, followed by an ANOVA comparing the performance of English speakers at the

treatment school with English speakers at the control school on the PPVT, only (no TVIP analysis was possible, as English speakers at the control school were not tested with the TVIP). In examining the sample sizes, however, of each subgroup, it was noted that the number of Spanish speakers at the treatment school outnumbered the number of Spanish speakers at the control school by almost two to one, and the same disproportionality existed between the English speakers at the control school and the English speakers at the treatment school.

To account for disproportionate sample sizes of the home language subgroups, each student's test score was weighted to render a 50% proportion of the overall sample. All the tests were conducted originally with unweighted samples, then conducted again with weighted samples, to ensure that the disproportionality of sample sizes was not interfering with results. The overall significance of the unweighted tests was not changed by weighting the sample sizes for parity.

Table 6

Sample Size by Home Language Subgroups: PPVT and TVIP, Unweighted and Weighted

| | Sample Sizes Unweighted | | | |
|------------------|-------------------------|----------------|------------------|----------------|
| | PPVT | | TVIP | |
| | Treatment school | Control School | Treatment School | Control School |
| Spanish Speakers | 125 | 63 | 125 | 57 |
| English Speakers | 41 | 75 | 40 | -- |
| | Sample Sizes Weighted | | | |
| | PPVT | | TVIP | |
| | Treatment school | Control School | Treatment School | Control School |
| Spanish Speakers | 94 | 94 | 91 | 92 |
| English Speakers | 58 | 58 | 40 | -- |

To demonstrate the disproportionality of groups, Table 6 displays the sample size

data before weighting. Table 6 (bottom half) also displays the sample sizes after weighting.

The results of the one-way ANOVA that tests whether mean PPVT scores for the English-speaking subgroups at the treatment and control schools vary significantly are presented in Table 7.

Table 7

One-way ANOVA of PPVT Percentile Rank 2009-10 by English Home Language

Groups

| Dependent Variable | Groups | SS | df | MS | F | p* |
|----------------------------|---------|-----------|-----|----------|-------|------|
| PPVT Percentile Rank 09-10 | Between | 2147.852 | 1 | 2147.852 | 3.374 | .035 |
| | Within | 71931.978 | 113 | 636.566 | | |
| | Total | 74079.829 | 114 | | | |

* $p < .05$, one-tailed

It can be seen in Table 7 that when comparing the English-speaking subgroups' PPVT percentile ranks across the two schools, the sum of squares (SS) = 2147.852, $F=3.374$, $df = 1$, and $p = .035$ (one-tailed). The null hypothesis that the mean PPVT percentile ranks of English speakers in the control school would be greater than or equal to the mean PPVT percentile ranks of English speakers in the treatment school is rejected, since $p < .05$ (one-tailed). Therefore, in answer to research question number one, there is a significant difference between the mean PPVT scores of English speakers in the treatment school and English speakers in the control school; in this instance, that the scores of English speakers at the treatment school are higher. An ANOVA model was also estimated to test whether the difference between mean PPVT percentiles of the Spanish-speaking subgroups across schools was significant. These results are presented in Table 8.

Table 8**One-way ANOVA of PPVT Percentile Rank 2009-10 by Spanish Home Language****Groups**

| Dependent Variable | Groups | SS | df | MS | F | p |
|----------------------------|---------|-----------|-----|---------|------|------|
| PPVT Percentile Rank 09-10 | Between | 266.621 | 1 | 266.621 | .651 | .210 |
| | Within | 75711.637 | 185 | 409.252 | | |
| | Total | 75978.258 | 186 | | | |

Alpha = .05; one-tailed

In Table 8, it can be seen that when comparing the Spanish-speaking subgroups across the two schools, the sum of squares (SS) = 266.621, F = .651, df = 1, and p = .210 (one-tailed). The null hypothesis that the mean PPVT percentile ranks of the Spanish-speaking students at the control group are greater than or equal to the mean PPVT percentile ranks of the Spanish-speaking students at the treatment school cannot be rejected, as $p > .05$. Therefore, in answer to research question two, the Spanish speakers at the treatment school are not attaining PPVT percentiles that are significantly higher than the PPVT percentile ranks of Spanish speakers at the control school.

Table 9**One-way ANOVA of TVIP Percentile Rank 2009-10 by Spanish Home Language****Groups**

| Dependent Variable | Groups | SS | df | MS | F | p* |
|----------------------------|---------|------------|-----|----------|-------|------|
| TVIP Percentile Rank 09-10 | Between | 2607.198 | 1 | 2607.198 | 3.196 | .037 |
| | Within | 147637.936 | 181 | 815.679 | | |
| | Total | 150245.134 | 182 | | | |

 $p < .05$, one-tailed

A final one-way ANOVA was conducted, comparing Spanish-speaking student subgroup performance from the control and treatment schools, this time with the TVIP

percentile rank as the dependent variable. These results are presented in Table 9.

As can be seen from the comparison of Spanish speakers' TVIP percentile ranks across the two schools in Table 9, the sum of squares (SS) = 2607.198, F = 3.196, df = 1, and p = .037 (one-tailed). Therefore, the null hypothesis that the mean TVIP percentile rank of Spanish-speaking students at the control school is greater than or equal to the mean TVIP percentile rank of Spanish-speaking students at the treatment school is rejected, as p < .05. Treatment school Spanish speakers' percentile scores on the TVIP were significantly higher than those of the Spanish-speaking students at the control school. This answers research question number three, whether Spanish-speaking students' performance on the measure of Spanish proficiency would be higher than Spanish-speaking students at the control school.

From the preceding ANOVA tests, it can be seen that English-speaking students enrolled in the TWI program attained significantly higher PPVT percentile ranks than did English-speaking students at the control school, and Spanish-speaking students enrolled in the TWI program attained significantly higher TVIP percentile rankings than Spanish-speaking students at the control school for the 2009-10 school year. However, there is no significant difference in PPVT performance between the Spanish-speaking student subgroups at the treatment and control schools. Spanish speakers at the treatment school lag behind Spanish speakers on the PPVT at the control school, but not significantly. What is unclear—and impossible to determine from the data currently available—is whether the performance of the various groups is attributable to program involvement or to naturally occurring differences. It does not appear that involvement in the TWI program results in lower or slower English proficiency on the part of either English speakers or Spanish speakers at the treatment school, so the program is not hindering the English development of either group.

This result may also suggest that many of the Spanish speakers at the control school have stronger English proficiency than those at the treatment school, overall; but it was impossible to confirm this with the data from this study.

A student's degree of proficiency in the second language is a fluid condition and can be interpreted differently by different observers, especially if the outside observers are monolingual. The schools, as well as the researchers involved in this study, used information from the home language survey (filled out by parents) to determine which language is the child's dominant one. Discussions with the children's classroom teachers at the treatment school revealed that many children are listed as dominant in one language, although they appear to be equally or more fluent in another. Such a distinction can only be noted by teachers who are bilingual, however, and information of this nature was not available for the children at the control school, because all the classroom teachers, except for one in second grade, are English monolinguals.

The Spanish-speaking children's performance on the PPVT in the TWI program is lower than their control school peers, yet the variance is not significant and cannot be attributed to program involvement. The data are insufficient to conclude why this is so, although the trends suggest that Spanish speakers at the treatment school scored lower than the Spanish speakers at the control school from the beginning of testing, which might indicate that the treatment school Spanish speakers have more limited English proficiency than Spanish speakers at the control school. Again, data are insufficient to be able to state the reasons conclusively.

It is also necessary to position the data within the theoretical context described in a previous section of this article. If one examines the data from the perspective of Cummins'

language interdependence theory (1984), then the data suggest that Spanish-speaking students at the TWI school will eventually attain parity with (or even exceed) the Spanish-speaking students at the control school in English, as they already exceed the control students' performance in Spanish. The timeline by which this might occur is unclear: researchers estimate academic language development in a second language to take from 5-7 years, on average (Hakuta, Butler, & Witt, 2000). If so, then the comprehensive evaluation of a TWI program that begins in the primary grades must chart student progress and assess their performance and language development at least into middle school, if not beyond, to fully assess program advantages or disadvantages.

The English speakers in the TWI program, as representatives of the dominant culture and speakers of the dominant language, have not experienced any detrimental effect on their English proficiency. This finding is also congruent with the research literature (Cummins, 1981; Cummins & Swain, 1986; Galambos & Hakuta, 1988; Hakuta, 1985). At no grade level (K-3) are they behind the English speakers at the control school on the PPVT; in fact, their English proficiency typically exceeds it. As would be expected, their TVIP performance is behind their Spanish-speaking peers. It can be safely concluded that involvement in a bilingual program, in which half of the instruction is delivered in a second language every day, has not *hindered* the English speakers' native language development, as measured by the PPVT.

The researcher then considered the results through the lens of the language interdependence theory (Cummins & Swain, 1986) and decided to test whether there was any correlation between a student's performance on the PPVT and their performance on the TVIP. Although a correlation does not establish causality, an important component of

Cummins' theory, it nevertheless can demonstrate whether a significant relationship among two variables may exist. Testing for correlation between the two languages has been used in previous research studies regarding the relationship between first and second languages (Galambos & Hakuta, 1988; Hakuta, 1985). Kendall's tau-b and Pearson's Rho were computed to determine whether the relationship between PPVT performance and TVIP performance for all students is significant. These analyses were conducted separately, by school and home language subgroups, in keeping with the methodology used in the ANOVA procedure. No correlations were possible for English speakers at the control school, as they did not participate in TVIP testing. The results of the correlations are presented in Table 10.

Table 10

Correlations between PPVT Performance and TVIP Performance

| | Kendall's tau-b | p | Spearman's rho | p |
|----------------------------|-----------------|------|----------------|------|
| English Speakers—Treatment | .155 | .181 | .187 | .247 |
| Spanish Speakers—Treatment | .122 | .050 | .180 | .045 |
| Spanish Speakers—Control | .020 | .834 | .022 | .877 |

As can be seen in Table 10, no correlation coefficients can be considered high. However, the correlation between the PPVT and TVIP percentile ranks are significant for one subgroup, Spanish speaking students in the TWI program ($p = .050$ and $p = .045$, respectively). Although this finding does not indicate any causality, only a relationship, there appears to be support for Cummins' language interdependence theory for the Spanish speakers involved in the two-way immersion program, and findings are congruent with those in other research studies (Galambos & Hakuta, 1988; Hakuta, 1985). In short, Spanish-speaking students' performance on one test is significantly related to their performance on the other, although the correlations are low. These correlations are expected to increase over

time (1985), at least for the Spanish speakers enrolled in the TWI program. More analysis is needed to explore the causality of this relationship, which falls outside of the scope of this article.

Conclusion

In conclusion, the results of this study of students' developing language proficiencies in a new two-way immersion program are promising. Limited research has been conducted with children at the early primary level in two-way immersion programs, particularly since the assessment of primary age children is problematic, and even fewer focus equally on the benefits to majority- and minority-language students. The lack of long-term data prevents an analysis of trends, but the performance of students in the TWI program is satisfactory.

English speaking students in the TWI program are benefiting the most in terms of measurable English proficiency, using a receptive vocabulary measure like the PPVT. Spanish speaking TWI students' Spanish proficiency, as measured by the TVIP, outpaces that of their Spanish-speaking peers in the control school. This is important, since research indicates that students who develop higher native language proficiency tend to develop higher second-language proficiency, as well (Hakuta, 1985; Cummins & Swain, 1986). The TWI Spanish speakers' PPVT performance is slightly behind that of their peers, but the difference is not significant. It is too early and too small a difference to be attributable to program involvement. When examined over time (only three observations are available for the oldest student cohort), gains in Spanish-speaking students' PPVT scores at the treatment school compare favorably with gains in Spanish-speaking students' PPVT scores at the control school. However, the initial PPVT test scores at the treatment school began at lower levels than the control school, suggesting that the English learners in the TWI program had lower English proficiency than

English learners at the control school. This was anecdotally confirmed by teachers and administrators in the district, but could not be supported with any baseline proficiency data. The treatment school, overall, had more newcomers than the control school.

This study, as with all other research, had limitations. Originally intended as an 8-year study, the research project was terminated after four years for lack of continuation funding. This precluded any collection of longitudinal data and cut short the opportunity to measure outcomes for both minority-language students and majority-language students in an English-dominant, low socio-economic status, mid-sized Midwestern city. There is a need to report the impact and results of programs of this type in such heavily Anglo, English-dominant areas. Research like this is difficult, given the paucity of bilingual programs in the Midwest and in Iowa, in particular.

This study focused on a limited period of time in the language development of these young students. The majority of the children in the sample have been in school for two years or less; more time to follow the children's progress would be necessary to fully understand the nature and extent of the children's developing bilingualism, and to measure full academic impact of the TWI program. For the Spanish speakers, developing proficiency in both languages appears to be a symbiotic relationship that is not (yet) observable in any other subgroup. These students have the highest proficiency in their native language; it would take several years to fully assess how this circumstance influences their English development, as well as their academic achievement. In third grade, students are just beginning annual accountability testing for the state, so no data analysis using a common academic measure across the state, over time, was possible. In addition, cohort analysis of the students who have been involved in the program at least three or more years was impeded by extreme

levels of attrition: the number of students who remained from when they began kindergarten at either the control school or treatment school was in some cases less than 20%. This rendered sample sizes of student subgroups, such as 3rd grade Spanish speakers at the control school during the 2009-10, of only three students. Sample sizes of the subgroups for the first cohort of students (who were in kindergarten in 2006-07) were all less than ten.

Initial findings, though, indicate that this TWI program has no negative impact on English speakers' native language proficiency, and simultaneously develops their Spanish proficiency. The program appears to help Spanish speakers maintain and develop native language proficiency while developing their English proficiency. While long-term results cannot yet be observed, the initial results are very promising and support bilingual programming of this type for both language-minority and language-majority students.

Chapter Four: Two-Way Immersion Benefits for Students in the Primary Grades

Abstract

Researchers have investigated and discussed the advantages and disadvantages of learning and knowing more than one language for decades. Does developing proficiency in two languages truly impact students' thinking, and consequently their performance on academic measures? In this article, the results from a research study on second and third grade students enrolled in a two-way immersion (TWI) program in a large, urban elementary school in a small Midwestern city are presented and discussed. Overall, language-majority students in the two-way immersion program significantly outperformed similar students in a control school on norm-referenced, academic measures of reading and mathematics. Language-minority students, in this case, Hispanic Spanish speakers, scored slightly higher than Hispanic Spanish-speaking peers, but the differences were not significant. The correlations, however, between Hispanic Spanish speakers' Spanish language proficiency and of their reading and mathematics scores were significant in the TWI program. There were no significant correlations between Spanish language proficiency scores and reading and mathematics scores for any other student subgroup.

Introduction

Today, one of every three Hispanic American⁷ adults has dropped out of high school (Pew Hispanic Center, 2010), over one-fourth live at or below the poverty line (National Poverty Center, 2009), and Hispanic Americans continue to lag behind their White and non-

⁷ The author acknowledges that specific terms for designating ethnicity are a matter of personal preference. For this paper, in an effort to be inclusive of all Spanish-speaking and Spanish-language-heritage groups, the terms "Hispanic American," "Hispanic," and "Latino" will be used interchangeably..

White peers on national, norm-referenced measures of achievement. Hispanic students born outside the United States are more than three times as likely to drop out as Hispanic students who are U.S. born (National Center for Education Statistics, 2008). They represent over 17% of the total population, yet comprise over 43% of all dropouts (National Center for Education Statistics, 2008).

On the National Assessment of Educational Progress (NAEP) in reading, fourth and eighth grade Latino students consistently have scored below their White counterparts for the last 15 years by an average of 25 points, based on national average scale scores (National Center for Education Statistics, 2009). Although Latino students' scores have improved slightly since 1992, White students' scores have improved at a comparable rate, rendering the gap between Latino and White students' performance on the NAEP in reading just as wide today as it was 15 years ago (National Center for Education Statistics, 2009). Students' performance on the NAEP mathematics composite has improved slightly since 1996, but Latino students' scores still lag more than 20 points behind White students' scores (based on a scale of 0-500) (National Center for Education Statistics, 2009). Efforts to eradicate or even narrow the gap have been unsuccessful, and the overall achievement gap is even greater for students who represent language minorities. English learners (of all ethnicities) score an average of 36 points (on a scale score 0-500) behind English-speaking students on the fourth grade NAEP in reading, while the gap widens to over 40 points for eighth grade English learners (National Center for Education Statistics, 2009). In mathematics, English learners score an average of 24 points (based on 1996-2009 data) behind English-speaking students at fourth grade, and an average of 46 points behind at eighth grade (National Center for Education Statistics, 2009).

Hispanic children face more at-risk factors⁸ than non-Hispanic White children; the proportion of children with two or more risk factors among Hispanics (33 %) remains over five times that of non-Hispanic Whites (6 %) (President's Advisory Commission, 2003). This ethnic group is also one of the fastest growing groups in the U.S. today. U.S. census figures report that Hispanics comprised 12.5% of the U.S. population in 2000, a number that had grown to 15.4% by 2008 (U.S. Census Bureau, 2010). Overall, the Hispanic population has grown rapidly over the last four decades and is currently the largest minority ethnic group in the U.S. Conservative estimates predict that by the year 2040, less than half of all school age students will be non-Hispanic White (Hernández, 2004) and over one-third of the workforce will be representative of non-White ethnic groups. As Hernández (2004) put it, in thirty years' time, the current majority-White society will be relying on a majority Hispanic, Asian, and African American workforce for its support and well-being. Even more disturbing for the future, Hispanic language-minority students finish high school, pursue higher education, and complete college degrees at much lower rates than other student sub-groups (Adelman, 2007; Ficklen & Stone, 2002; Garcia, 2004; Yun & Moreno, 2006).

In Iowa, Hispanic student statistics differ from national trends, but are still of concern. During the 2009-10 school year, over 20,000 students were considered English learners, or Limited English Proficient (Iowa Department of Education official term), and half of those students were enrolled in grades K-3. English learners (of any ethnicity) represented a total of 4.2% of the K-12 student enrollment in the fall of 2009. Students who

⁸ "At-risk factors being defined as: coming from a single-parent home, having a mother with less than a high school education, being in a family that has received welfare or food stamps, and having a parent whose primary language is something other than English" (President's Advisory Commission on Educational Excellence for Hispanic Americans, 2003, p. 18).

identified themselves as Hispanic or Latino represented just over 8.0% of the 2009-10 Iowa K-12 total student enrollment (Iowa Department of Education, 2010). The state dropout rate has hovered around 1.7% over the last ten years, but the dropout rate for Latino students is over twice that, at around 3.9% over the last five years (Iowa Department of Education, 2009). The overall graduation rate in Iowa averaged 87.2% during the 2008-09 school year, while the graduation rate for Hispanic students was 71.6% (Iowa Department of Education, 2010). As is the case across the nation, Latino students in Iowa are more at-risk and are less likely to graduate than their Anglo counterparts.

The need to successfully educate Latino students, especially language-minority Latino students, is critical in Iowa as well as in every other state. The research literature is clear regarding the general characteristics of the most effective programs for language-minority students, apart from the program model and language of instruction. Effective language-minority student programs have demonstrated consistent success in achieving high academic outcomes with their students (Garcia, 2004). The characteristics include:

1. Student-centered learning. Students are actively engaged in their own learning, activities are meaningful and language-rich, and students are engaged in cooperative, interactive learning activities.
2. Primary language foundation. Primary language is considered an asset in students' educational foundation and is nurtured as such. It is carefully and purposefully integrated into instruction.
3. Strategies and contexts for second-language development. These are carefully constructed and organized to meet individual needs, are meaningful, and enhance student understanding.

4. Parent (and community) involvement. There are strong home-school connections in place; parents are involved in their child's education and are welcomed in the building.

5. Cross-cultural interactions/mainstream integration. Cross-cultural interactions are planned and supported by teachers and school leaders to foster cross-cultural awareness and appreciation. These interactions include integration at some level with mainstream classrooms and students (August & Hakuta, 1998; García, 2004; Thomas & Collier, 1997).

In light of the studies above, language-minority students can achieve academic success (Garcia, 2004), such as performing at the same levels as their English-speaking peers on district and state assessments. The most effective programs are those that fall under the classification of Dual Language, a broad term that encompasses any “program that provides literacy and content instruction to all students through two languages and that promotes bilingualism and biliteracy, grade-level academic achievement, and multicultural competence for all students” (Howard, Sugarman, Christian, Lindholm-Leary, & Rogers, 2007, p. 1).

Two-way immersion programs are considered dual language programs and have been shown to have some of the greatest success with language-minority students (Bikle, Billings, & Hakuta, 2004; Collier & Thomas, 2004). Two-way immersion programs are those that involve both language-minority and language-majority students in the bilingual/biliterate instructional environment in the classroom (Cloud, Genesee, & Hamayan, 2000; Lindholm-Leary, 2001). Congruent with the program characteristics outlined above, two-way immersion programs integrate language learning with content instruction and emphasize cross-cultural skill development. Such an approach is ideally suited to the linguistically

diverse students, who represent both the minority and majority languages, in the two-way immersion classroom. Each group is learning a second language and developing both bilingualism and biliteracy. Two-way immersion is an enrichment program for both populations.

Because of the many risk factors faced by Hispanic language-minority students, there is a need to more closely investigate programs intended to effectively educate language-minority students in a manner beneficial to all students, especially in a region where cultural and linguistic diversity is uncommon. The opportunity to conduct this research presented itself when a small group of administrators in a Midwestern urban school district sought to implement a two-way immersion program in one elementary school in 2006. Their desire was to create a program that built on the cultural, linguistic, and economic diversity in the school and instilled in its students a sense of pride in their bilingualism and ethnic heritage. A primary goal, in addition to academic success, was to develop full proficiency in both languages, Spanish and English, for all of the students, both English-speaking and Spanish-speaking. The following section highlights findings from the research literature to outline the rationale for two-way immersion programming, the theory supporting its implementation, and a context for this research study.

Review of Literature

Educators continue to debate the advantages of bilingual education programs over English-only programs. In fact, the argument has entered the arena of politics, with citizen groups' sponsoring legislation in several states that would ban bilingual education (English for the Children, 1997; Mora, 2009). Regardless of the opinions on either side, there is no argument regarding whether or not language-minority groups, in particular Hispanic

language-minority groups, need to be better served by public schools. Second-language learners from language-majority groups have long benefitted from immersion programs or foreign language programs to promote biligualism (Caccavale, 2007; Cummins & Swain, 1986; Peal & Lambert, 1962). However, Hispanic language-minority students have not equally benefitted from English immersion programs (Cummins & Swain, 1986; Thomas & Collier, 1997). Researchers have examined reasons for this.

Most language-minority students are acquiring English in subtractive, English-only environment rather than an additive one (Wiley & Lukes, 1996). This means their proficiency in their native language is overlooked or ignored and eventually edged out by the acquisition of English proficiency. Such programs remain the most common type of program serving language-minority students, despite clear research findings that demonstrate that English learners benefit most and attain higher levels of fluency and literacy when they have support and instruction in their native language (Alanis, 2000; 1998; Christian, Montone, Carranza, Lindholm, & Proctor, 1996; Cobo-Lewis, Pearson, Eilers, & Umbel, 2002a; Collier & Thomas, 2004; Cook, 1990; Danesi, 1993; Hernández, 2001; Lindholm-Leary, 2001; Ramirez, Yuen, Ramey, & Pasta, 1991; Slavin & Cheung, 2003; Thomas & Collier, 1997; Willig, 1985).

In light of the academic performance of English learners in U.S. schools today, particularly Hispanic language-minority students, exploring and understanding how children develop proficiency in two or more languages and how this development relates to performance on academic measures are vital to designing educational programs that are successful in maximizing student learning. The next section summarizes some of the challenges to any type of research in bilingual education that the researcher attempted to

address.

Challenges in Bilingual Education Research

One of the greatest inconsistencies in any study of bilingual children and bilingual education programs is the use of the term “bilingual.” As has been pointed out, there are two distinct populations in schools today that are bilingual—those representative of language minorities, or circumstantial bilinguals, and those representative of the language majority, or elective bilinguals (Cummins & Swain, 1986; Valdés & Figueroa, 1992). Beyond those distinctions, which have both linguistic and cultural ramifications, is the concept that “bilingual” refers to proficiency in two languages. It is the level of that proficiency in each language that can vary drastically and which can lead to great inconsistency in using the term. Some researchers or educators might call any level of proficiency in both languages adequate, and therefore refer to the student as bilingual, while others might use the term exclusively for those students who have attained a degree of native-like fluency across all four domains: reading, writing, listening, and speaking (Umbel, Pearson, Fernández, & Oller, 1992). A student’s proficiency in either language falls on a continuum, and only a fellow bilingual equally or more skilled in those same two languages is qualified to determine where the proficiency of that student falls—something the majority of monolingual educators cannot do (Hernández, 2003). In fact, a student’s perceived lack of proficiency in one language is not necessarily indicative of proficiency in the other; therefore, it would be a fallacy to assume a student’s academic or cognitive weakness based on their lack of proficiency in a language (2003).

A second challenge in reading, interpreting, and conducting bilingual education research is in understanding the unique position assessment has with relation to bilingual

students. At fundamental (and not fully understood) levels, the bilingual child and his cognitive processes differs from the monolingual child and her cognitive processes (Valdés & Figueroa, 1992), and few, if any, assessment instruments are designed to take that into consideration. This renders the validity of any assessment instrument, created for monolinguals, and normed on monolingual populations, problematic when used with bilinguals (Valdés & Figueroa, 1992). Even if an assessment instrument has been developed in English and translated into Spanish, the forms are rarely consistent and cannot be used as perfectly parallel measures (Umbel, Pearson, Fernández, & Oller, 1992; Valdés & Figueroa, 1992). In fact, Umbel et al. (1992) claim that no standardized test “fully assesses the knowledge of bilingual children” (p. 1019) and suggest using parallel assessments in each language as an imperfect solution until better measures are developed (1992). As Clarkson and Galbraith (1992) state, “bilingualism should not be treated as a single, unidimensional entity in research studies” (p. 42). They argue that great care should be taken in assessing proficiency in both languages along a continuum—a clear classification of a student’s proficiency—and taking that classification into account along with all other variables (1992).

Assessing bilingual students is fraught with challenges and bias, yet the results from standardized assessments continue to form the basis by which English learner educational progress, intellectual ability, and language proficiency are measured (Figueroa & Garcia, 1994). Norm-referenced, standardized assessments do not, and cannot, effectively evaluate what bilingual students know or can do, since they are normed against monolingual populations. They reveal that language-minority bilingual students lack the cultural capital these tests measure; virtually every ethnic group since the 1900s has fared badly on tests developed by U.S. publishing companies (Figueroa & Garcia, 1994; Valdés & Figueroa,

1992).

Accurately assessing bilingual students' academic progress is always two-fold; language proficiency must be assessed together with academic achievement, to prevent mistaking language difficulties with cognitive difficulties (Cummins, 1984; Figueroa, 2005; Goldenberg, 2007). Such mistakes in assigning cognitive deficiencies to a child can cause lasting harm (Cummins, 1984). Whenever possible, particularly in the case of students with special needs, English learners should be tested in their native language (Baca & Cervantes, 2004). When researchers are assessing bilingual knowledge, they should likewise assess the amount of exposure in hours and intensity the child has had in each language, as this may impact outcomes (Umbel, Pearson, Fernández, & Oller, 1992).

Issues Pertinent to Language-Minority Bilingual Students

Given the challenges cited above in understanding and researching bilingual education and the issues related to it, it is no surprise that so much controversy has persisted regarding its benefits and consequence. More challenges will be discussed in this section, but these factors all pertain to circumstances encountered only by language-minority students, only, in their acquisition of knowledge and development of bilingual proficiency.

The first factor impacting language-minority students' overall achievement is their possible status as an immigrant, whether documented or not (the author acknowledges that many language-minority students in U.S. schools are U.S. citizens or even grandchildren or great-grandchildren of first generation immigrants). Non-native born students are more likely to drop out and are less likely to succeed on academic measures than their U.S.-born peers from within the same ethnic group (National Center for Education Statistics, 2009^a; 2010). Considerable research has been conducted to examine possible relationships between

immigrant status and student achievement, self-efficacy, and attitudes. These students, particularly those of Hispanic/Latino origin, can internalize the racism and anti-immigration sentiments expressed across the U.S. As Suárez-Orozco, Suárez-Orozco, and Doucet (2004) describe, immigrant youths must contend with the fact that they are culturally, ethnically, and racially “Other” (p. 428). A large-scale National Research Council study found that the longer immigrant youths are in the U.S., the poorer their overall physical and psychological health (Suárez-Orozco, Suárez-Orozco, & Doucet, 2004). Other studies have shown that students who start school in the second language (with no prior educational experience in their native language) may fail to acquire fluency in either language and also do more poorly academically (Cummins & Swain, 1986; Umbel, Pearson, Fernández, & Oller, 1992).

When immigrant students are not enrolled in bilingual or immersion programs, they contend with a subtractive bilingual environment. No effort is made to maintain or nurture their native language—their language and identity is seen as a “problem,” although they are not in any way cognitively deficient (Escamilla, 2006). Latino language-minority students have more to learn than their language-majority, monolingual peers. In addition to learning English, they must keep pace with all the content students are expected to master in each discipline—a herculean task for an adolescent with high school course content and materials (Goldenberg, 2007). This situation is compounded by the knowledge that acquiring academic English, the type of English these students need in order to be successful on measures of academic performance, can take four to seven years for English learners of any ethnic background (Hakuta, Butler, & Witt, 2000).

As mentioned above, language-minority students who begin school in the second language miss the opportunity to develop their native language to maturity. Uchikoshi

(2006) found that students who have lived in the U.S. longer before starting school have a significantly higher score on initial assessments of receptive vocabulary. Since language-minority students' English may not yet be fully developed, a consequence of this situation is that these students may find themselves categorized as not proficient in *either* language. Cummins (1984) coined a term to describe this phenomenon, referring to these students as “semilinguals.” The label has not served language-minority students well. Mainstream teachers who are themselves monolingual are too quick to assume deficiencies in both languages when reading and writing skills are poor (Valadez, MacSwan, & Martínez, 2001). Illiteracy, however, must not be confused with semilingualism, just as poor English proficiency does not constitute inadequate native language proficiency. Careful assessment in both languages is needed before a student can be classified as “semilingual,” and this should only occur when multiple domains—such as reading, writing, speaking, and listening—and skills across those domains have been evaluated (Escamilla 2006; MacSwan, Rolstadt, & Glass, 2002). In a study conducted by Valadez, MacSwan, and Martinez (2001), researchers carefully evaluated the oral language of 25 students, half of whom had been referred by teachers and school psychologists as being “clinically disfluent” or semilingual. The other students were assessed for grade-level controls. The children referred for the study were all academically low. These researchers concluded that all the students labeled “semilingual” verbally performed on par with students who were not identified as semilingual. Such findings indicate the label may be inappropriately applied and misinterpreted by educators in contact with the student.

The next sections will present theories concerning bilingual development in language-minority and language-majority children, followed by findings concerning the benefits or

limitations of bilingualism with regard to academic achievement.

Theories in Language Development and Cognition

Theory is a critical aspect in both framing and interpreting research. Cummins (1984) discusses the importance of theory in analyzing data, stating that, “without a theoretical framework for conceptualizing these relationships, legitimate empirical questions cannot even be asked” (1984, p. 16). Theory not only suggests a relationship among the variables and issues involved with bilingualism, but also helps to define variables more clearly (Cummins, 1984).

Cummins (1984) proposed a theory that suggests that all language development and management within the brain is interrelated. He suggests that certain functions and cognitive processes that take place in one language are directly related to the person’s second language (1984). He calls this concept Common Underlying Proficiency. It has long been known that when a child learns to read in one language, they can also read in any other language if they learn the vocabulary and phonemic system. Cummins’ theory expands to the issue of language interdependence. He claims that native language proficiency is significant in the role of second language proficiency development (Cummins & Swain, 1986). In other words, students’ proficiency in their native language can have a significant impact on their proficiency in a second language.

This theory is key in understanding why support in the native language plays such an important role in language-minority students’ acquiring stronger English skills (Garcia, 1993). A few studies pertinent to this theory are summarized here. Mahon (2006) found that in Spanish language-minority bilinguals, their Spanish academic achievement alone accounted for 50% of the variance in English academic achievement scores on the Colorado

Student Assessment Program instruments (CSAP). López and Tashakkori (2006) found that students with low-levels of English proficiency acquired higher levels of oral proficiency in English when provided with more native language support. Hakuta (1985) found an increasing correlation between the abilities of children in two languages over time, reaching correlations up to $r = .70$. He also observed that children who began with a strong first language ended up with stronger second language, or English, skills. Thomas and Collier (1997) found that language- minority students who maintain uninterrupted cognitive development in their first language until the age of twelve have higher (English) academic performance than their monolingual peers. Cook (1990) similarly reported that Hispanic children who speak Spanish in the home did better on the California Test of Basic Skills, administered in English, if the children maintained oral and written literacy in Spanish.

Conversely, Hernández (2001) found that skills only practiced or developed in the second language can transfer effectively to the first language. She found that Spanish bilinguals who had only learned and practiced writing in English were able, with minimum support, to write successfully in their native language, demonstrating further evidence that skills transfer across languages. As Genesee (2000) reports in an article on brain research, the brain and its functioning is extremely complex and interrelated. Nothing occurs or is processed in isolation; nor does processing necessarily occur in a linear fashion, one skill at a time. Pathways are established in varied and multiple directions, in response to need, not according to a pre-determined pattern (Bialystok, 2009).

Understanding bilingual thought processes and components is important to understanding the underlying strengths of every bilingual, whether language-minority or language-majority. Bialystok (1987, 1998, 2007) emphasizes the need to more thoroughly

understand how different degrees of bilingualism impact cognitive functioning, such as metalinguistic skills or problem-solving, and how those skills are related to performance on academic measures, such as tests of reading, writing, and mathematics. A clearer understanding of this process in every child equips educators and policy makers to design curriculum and programs that are best suited to meeting their needs.

Cognitive Impact of Bilingualism

Bilingualism definitely shapes a person's thinking processes and results in a brain that functions, at a foundational level, differently than a monolingual brain. Some of these differences are explored in this section.

The cognitive benefits of bilingualism have been researched for many years, but investigators are only beginning to understand the significance of the findings and apply those findings to decision making at school and policy levels. Two main areas of linguistic development have been the focus of the majority of research studies in the last 30 years, vocabulary size or development and metalinguistic skills. To summarize, metalinguistic skills, or a person's thinking about their own language or language processing, has been shown to be more sophisticated and developed among bilinguals (Bialystok & Majumder, 1998; Bialystok, Majumder, and Martin, 2003; Galambos & Hakuta, 1988). Phonological awareness, another metalinguistic skill, has been shown to predict reading achievement in English (Linan-Thompson, Vaughn, Hickman-Davis, & Kouzekanani, 2003), and Durgunoğlu (1993) found that such phonological awareness skills transferred across languages. It would seem, then, that the distinct advantages bilinguals obtain from increased metalinguistic control does translate into improved reading skills in the classroom, but more information is needed to better understand that relationship to inform curriculum design and

delivery and even policy (Francis, 2002; Hakuta, 1985).

Vocabulary is a critical area of development for all children. In the area of vocabulary size and development, the findings from research are more consistent. Droop and Verhoeven (2003) found that second language (L2) vocabulary knowledge and oral proficiency strongly predicted reading comprehension in the L2 for minority students. Oullette (2006) found, with a sample of monolinguals, that receptive vocabulary breadth (the size of the lexicon) alone predicted decoding performance, whereas expressive vocabulary breadth predicted visual word recognition. Vocabulary relates to reading comprehension for ELLs; and the authors report that low vocabulary is a typical determinant of poor reading comprehension (Carlo, August, Mclaughlin, Snow, Dressler, Lippman, Lively, & White, 2004)

Relevance of Research Study

As a result of their involvement in a two-way immersion program, this study was designed to evaluate the extent to which students' developing language proficiencies affect their academic performance on a standardized, national measure of reading and mathematics. The following questions guided the research project and form the basis for the investigation.

1. Does bilingual students' knowledge of two languages, as measured by a standardized receptive vocabulary instrument in each language, have a relationship with their academic performance in reading?
2. Does bilingual students' knowledge of two languages, as measured by a standardized receptive vocabulary instrument in each language, have a relationship with their academic performance in mathematics?

3. Do English speakers in a bilingual, two-way immersion program perform better than English speakers in a traditional, English-only program on a standardized assessment of reading?
4. Do English speakers in a bilingual, two-way immersion program perform better than English speakers in a traditional, English-only program on a standardized assessment of mathematics?
5. Do Spanish speakers in a bilingual, two-way immersion program perform better than Spanish speakers in a traditional, English-only program on a standardized assessment of mathematics?
6. Do Spanish speakers in a bilingual, two-way immersion program perform better than Spanish speakers in a traditional, English-only program on a standardized assessment of reading?

These questions guided the methods and procedures used to collect and analyze data for this study. In the next section, more detail is provided concerning the context of the study, the instruments used to evaluate participants' language proficiency and reading and mathematics performance.

Methodology

This research study was the result of a four-year project led by a research team from the National K-12 Foreign Language Resource Center (NFLRC) at Iowa State University, funded by the U.S. Department of Education⁹. The study investigated the possible benefits of a new two-way immersion program at a large, urban elementary school with a high

⁹ This project was supported with funding from the U.S. Department of Education, Office of Postsecondary Education, Center for International Education, under grant no. P229A060013-07 to Iowa State University.

percentage of Hispanic English learners in a medium-sized city in Iowa. With only two other active TWI programs in the state, no one had yet investigated the success of such programs in a heavily Anglo, English-dominant region. The percentage of English learners in Iowa remains low, in comparison with the rest of the U.S., at less than 5% (Iowa Department of Education, 2010). However, some schools face enrollments of over 50% Spanish-speaking English learners, typically in regions that until recently, had had no experience with English learners (Iowa Department of Education, 2010). Originally intended as an 8-year study, the research project was terminated after four years for lack of continuation funding. .

The researchers selected a quasi-experimental research design, since no random sampling was used to identify students in the treatment or control schools. The TWI program, a voluntary program, was begun in kindergarten in 2006-07 and was considered the “treatment” for this study. A second school in the same district was selected that had similar demographic characteristics to serve as a control school. The control school was matched to the treatment school on the characteristics of ethnicity, poverty, home language, and urbanicity. All students enrolled in the TWI program at the treatment school were invited to participate in the study, as were all the students at the same grade levels at the control school. This study began with kindergarten students in 2006-07 and concluded with grades K-3 in the 2009-10 school year. Parents/guardians at both schools were asked to sign consent forms¹⁰ (provided in both Spanish and English to all parents/guardians) if they wished their child to be included. The response rate (for both affirmative and negative responses) in the treatment school remained around 95-100% for all four years, while the rate at the control school remained around 70-80% each year. Most parents granted consent for their child to be

¹⁰ Consent forms approved by the Iowa State University Institutional Review Board. Project IRB approval number 06-381.

involved in the study. A variety of data was collected, including students' ethnicity, gender, home language, year of entry into the school/program, and birth date. Income information about the students, such as the percentage who qualified for free/reduced-price lunch, was available for the entire school, not for individual children. Data from district-administered assessments were collected, and the researchers also administered assessments of their own, intended to measure language proficiency; student and parent attitudes; and teacher, principal, and staff attitudes toward the principles of bilingual education.

Participants

For this study, the participants included all second and third grade students enrolled in the TWI program at the treatment school for whom the research team had parental consent, and all second and third grade students at the control school for whom the research team had parental consent during the 2009-10 school year. The participants shared similar demographic characteristics, particularly the characteristic of socio-economic status. Over 90% of the students at both schools qualified for free or reduced-price lunch. Poverty is an important variable to control for due to its overall impact on school performance (Walker, Greenwood, Hart, & Carta, 1994). All students were taught using similar materials and curriculum; the key difference is that students in the TWI program received half of their instruction each day in Spanish. Both schools had both English speakers and Spanish speakers represented in each classroom, although while the treatment school had several bilingual teachers on staff, only one of the control school teachers (first grade) was bilingual. All teaching at the control school was delivered in English.

Instruments

Two main assessment instruments were used for this study. The Peabody Picture

Vocabulary Test-III (PPVT) (Dunn & Dunn, 1986) was used to evaluate students' proficiency in English. The test has been used for many years and has high validity (Millett, Atwill, & Blanchard, 2008; Uchikoshi, 2006). The median alpha reliability for Form IIIB of the PPVT is .95, and repeated studies have confirmed a high degree of consistency in the measurement of PPVT scores (Williams & Wang, 1997). Validity of the test has also been confirmed by correlations with other tests of vocabulary knowledge, and is also demonstrated by the manner in which PPVT test items were developed (Williams & Wang, 1997). PPVT Form IIIB is considered one of the most reliable tests in the field of language measurement (Williams & Wang, 1997) and has been used in other studies as a measure of language proficiency (Uchikoshi, 2006; Umbel, Pearson, Fernández, & Oller, 1992). The PPVT has a Spanish language version, called the Test de Vocabulario en Imágenes Peabody (TVIP) (Dunn, Luga, & Dunn, 1986). The TVIP was used in the study to evaluate students' proficiency in Spanish. Both the PPVT and the TVIP are measures of receptive vocabulary; in other words, students are not required to speak during the assessment. Each student is presented with four pictures grouped together on a page, after which the test administrator states a word without any definite or indefinite article. The student then points to, or says the number underneath, the picture that corresponds to that word. Both tests are designed for use with children age 2.5 to adults age 90. The PPVT is normed against an English-speaking, monolingual, U.S.-based sample, while the TVIP is normed against three different Spanish-speaking monolingual populations (test administrators select which population norms to use in calculating percentiles). The three populations are from Puerto Rico, Mexico, or Spain. The norms from Mexico were used for this study because most of the Spanish-speaking students in the treatment and control schools are of Mexican descent.

The second assessment instrument that was used as the measure of academic performance was the Iowa Test of Basic Skills (ITBS) (Hoover, Dunbar, & Frisbie, 2003). The ITBS is a norm-referenced, standardized assessment administered in reading and mathematics to all students in second through fifth grade at the treatment and control schools. The test results reported back to the schools include information on each subtest regarding the student's raw score, national percentile rank, national grade equivalent, Iowa percentile ranking, Iowa grade equivalent, and a listing of item responses. The subtests for Reading include vocabulary and reading comprehension; for mathematics, they include concepts and estimation, problem solving and data interpretation, and math computation. Both reading and math sections report a total reading and total math score, as well. For this study, second and third grade students' national percentile ranks for the two reading and three math subtests were used as the dependent variables in Analysis of Variance tests (ANOVA). Reading scores were used since reading directly relates to the skills taught in both languages in the students' classroom, and mathematics were used (particularly computation) because no significant relationship between students' language proficiency and mathematics skills was expected, at least with the computation subtest. This subtest involves working number problems and does not rely on language as do the other mathematics subtests.

The ITBS is administered only in English, but allows for within and across group comparisons. The students took the assessment along with other students in their classroom and grade level, without assistance from NFLRC research team members and under the supervision of their classroom teacher

The researcher administered the PPVT and TVIP instruments to participants in the spring of the 2009-10 year, along with other members of the NFLRC research team.

Students were tested in a quiet location of the school, sometimes within his or her own classroom if space was limited outside the classroom. The assessment lasted no more than 15 minutes, after which the student returned to his or her classroom or desk. Only Spanish bilingual students (identified as English learners) were tested with the TVIP in addition to the PPVT-III at the control school. At the treatment school, all students were tested with both the PPVT and the TVIP.

The PPVT and TVIP tests were scored similarly. For each student, a base and a ceiling were established for the vocabulary knowledge, and a raw score was computed from the correct number of the child's responses. Based on the child's chronological age, a standard score was computed from the test administrator's booklet, from which the national percentile rank, norm curve equivalent score, stanine, and national grade equivalent were computed. For this study, the national percentile rank was used, as it served as a common metric with the ITBS.

The ITBS was administered to students in January 2010. Classroom teachers administered the assessment over several days, reading the test aloud to second graders but requiring third graders to complete the test independently. The researcher received the test data from the school district in May of 2010.

Analysis of Data

The PPVT and TVIP scores were used as measures of first and second language proficiency for each student. Two scores, then, were available for all students at the treatment school and for Spanish speakers at the control school. The researcher first tested the correlation between students' PPVT scores and their TVIP scores, to see if any relationship existed between the two measures. The results and the corresponding n for each

subgroup are presented in Table 1.

Table 1

Correlations between PPVT Performance and TVIP Performance

| | Kendall's tau-b | <i>p</i> | Spearman's rho | <i>p</i> |
|--------------------------------------|-----------------|----------|----------------|----------|
| English Speakers—Treatment (n = 41) | .155 | .181 | .187 | .247 |
| Spanish Speakers—Treatment (n = 125) | .122 | .050 | .180 | .045 |
| Spanish Speakers—Control (n = 65) | .020 | .834 | .022 | .877 |

In Table 1, it can be seen that the only significant correlations between PPVT scores and TVIP scores were obtained for Spanish speakers in the TWI program. The correlations themselves are small, indicating a weak but significant relationship between TWI Spanish speakers' first and second languages. This was not the case with Spanish speakers at the control school. Other researchers have observed similar correlations between the first and second language proficiencies of students in bilingual programs, and report that these correlations tend to increase over time (Cummins & Swain, 1986; Hakuta, 1985).

The correlations discussed here also support Cummins' theory of common underlying proficiency (1984), that students' first language proficiency is directly related to their second language proficiency (Cummins, 1984; Cummins & Swain, 1986). The researcher next tested whether students' language proficiency, as measured by the PPVT and TVIP, significantly correlates with their performance on the five ITBS subtests, to partially address the research question of whether students' bilingualism has a significant relationship with their academic performance. Table 2 presents, by student subgroup, the descriptive statistics for the variables used in the analyses that follow.

Table 2**Descriptive Statistics for Mean Student Percentile Ranks by Student Subgroups**

| | N | PPVT % | TVIP % | ITBS Rdg Vocab % | ITBS Rdg Comp % | ITBS Math ^a Subtest 1 % | ITBS Math ^a Subtest 2 % | ITBS Math ^a Subtest 3 % |
|-----------|----|--------|--------|---------------------|--------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| English | | | | | | | | |
| Control | 36 | 48.60 | | 47.41 | 48.36 | 45.85 | 52.54 | 45.10 |
| Treatment | 16 | 57.62 | 14.59 | 57.95 | 61.87 | 51.21 | 60.35 | 47.71 |
| Spanish | | | | | | | | |
| Control | 28 | 33.50 | 28.96 | 31.89 | 45.21 | 37.33 | 43.93 | 43.39 |
| Treatment | 70 | 26.40 | 36.75 | 34.19 | 45.27 | 40.15 | 44.24 | 47.49 |

^aMath Subtest 1: Concepts and Estimation; Subtest 2: Problem Solving and Data Interpretation; Subtest 3: Computation

Table 2 presents the mean percentile rank for student subgroups, by school and home language, for both language assessments and the ITBS reading and mathematics tests. There were 150 second and third grade students from the treatment and control schools who were included in this study. Note the disproportionate number of students in each home language sample across the two schools.

It is anticipated that PPVT scores will strongly correlate with the ITBS reading vocabulary and comprehension subtests, as the tests are both measures of English vocabulary. The researcher sought to determine whether students' Spanish proficiency, as measured by the TVIP, correlates with any of the ITBS subtests, as well.

Both Kendall's tau-b and Spearman's Rho were used to calculate the correlations due to the non-parametric nature of the data. All analyses were conducted using students' national percentile rank for each test, as percentiles represent a common metric across the PPVT/TVIP and ITBS subtests. The results are presented in Table 3.

Table 3**Correlations Between Students' PPVT and TVIP Scores and ITBS Scores**

| | English Speakers | | | |
|-----------------------------|------------------|---------------|---------------|---------------|
| | Control | | Treatment | |
| | PPVT (n = 33) | TVIP | PPVT (n = 16) | TVIP (n = 16) |
| Reading Vocabulary | .315 | NA | .485 | .053 |
| Reading Comprehension | .237 | NA | .153 | .021 |
| Math Subtest 1 ^a | .207 | NA | .071 | .361 |
| Math Subtest 2 ^a | .230 | NA | .126 | .189 |
| Math Subtest 3 ^a | .036 | NA | .107 | .015 |
| | Spanish Speakers | | | |
| | Control | | Treatment | |
| | PPVT (n = 26) | TVIP (n = 20) | PPVT (n = 69) | TVIP (n = 70) |
| Reading Vocabulary | .651*** | .054 | .579*** | .375** |
| Reading Comprehension | .689*** | .264 | .387** | .426*** |
| Math Subtest 1 ^a | .732*** | .216 | .372** | .272* |
| Math Subtest 2 ^a | .705*** | .126 | .400** | .357** |
| Math Subtest 3 ^a | .434* | .296 | .157 | .041 |

* $p < .05$; ** $p < .01$; *** $p < .001$

^aMath Subtest 1: Concepts and Estimation; Subtest 2: Problem Solving and Data Interpretation; Subtest 3: Computation. NA= Not applicable; TVIP not administered to control school English speakers.

From Table 3, it can be seen that no correlations between the PPVT and ITBS scores were significant in either school for English speakers. However, at both the control and treatment schools, PPVT scores correlated significantly with ITBS scores in all but one instance, math computation for the treatment school Spanish speakers. Math computation was the least significant correlation for the Spanish speakers at the control school ($p = .027$). This is to be expected, since math computation is the least language-dependent of all the mathematics subtests.

The most surprising results, however, are for the correlations found between the TVIP and the ITBS scores. For Spanish speakers in the TWI program at the treatment school, the

TVIP score was significantly correlated with the ITBS score for vocabulary ($p = .001$), reading comprehension ($p = .000$), concepts and estimation ($p = .023$), and problem solving and data interpretation ($p = .002$). There were no significant correlations between TVIP scores and ITBS scores for Spanish speakers at the control school. The researcher concluded that the two-way immersion program, for the Spanish-speaking bilinguals, encouraged or increased the relationship of their native language proficiency with their academic achievement, even on mathematics subtests that involved some reading comprehension. This unlikely relationship between native Spanish proficiency and an English-language academic assessment suggests that Cummins' theory regarding a common underlying proficiency (1986) is valid. It is interesting that the concept does not hold true for those Spanish-speaking bilinguals who are not involved in a two-way immersion program. Their Spanish proficiency (TVIP scores) did not relate significantly with any of the ITBS reading and math tests. Perhaps the lack of native-language integration in their schooling is a factor in the lack of relationship between their Spanish and ITBS scores.

For the Spanish speakers in the TWI program, the strongest relationship was between their TVIP and reading comprehension scores ($p < .001$). This correlation was even slightly higher than that between their PPVT and reading comprehension scores ($r = .387$ and $.426$, respectively), indicating a slightly more positive relationship. Although a correlation does not test causality, it is logical to expect the relationship to flow from language proficiency to standardized test performance, although such a hypothesis is typically tested with more advanced tests, such as structural equation modeling. However, the sample sizes for this study were so small when broken out by subgroup that structural equation modeling was not feasible in this instance. Nevertheless, the researcher believes that the Spanish speakers'

involvement in the two-way immersion program has only proved to be an asset to their overall academic performance, but especially to reading comprehension. When examining these results from the context of theory, such as Cummins' language interdependence theory (1984), the students' development of academic skills in Spanish is positively related with their development of academic skills in English.

After considering the relationship between language proficiency measures in Spanish and English and students' performance on reading and mathematics subtests of the ITBS, the researcher compared the variance of mean ITBS percentile rank of each home language subgroup across schools. This was done using a split file procedure in SPSS (PASW Statistics 18, 2009) and an analysis of variance (ANOVA), using the ITBS percentile ranks as the dependent variable. The variable school (treatment vs. control) was the factor in the comparison. Because sample sizes across subgroups were disproportional, the researcher weighted each case to adjust for disparate sample sizes. Case weighting was used throughout the ANOVA tests, to ensure that sample size was not skewing results. This rendered mean scores across groups that differed from the mean scores for unweighted subgroups (see Table 3 for unweighted sample sizes). The mean percentile ranks with case weighting typically favored the students at the treatment school, but weighting did not affect the overall significance of ANOVA results. The new descriptive statistics for the weighted samples are presented in Table 4.

Table 4

Descriptive Statistics for Mean Student Percentile Ranks by Student Subgroup with Case Weighting

| | N | ITBS Rdg Vocab | ITBS Rdg Comp | ITBS Math ^a Subtest 1 | ITBS Math ^a Subtest 2 | ITBS Math ^a Subtest 3 |
|-----------|-----|-------------------|------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| English | | | | | | |
| Control | 26 | 47.03 | 48.28 | 45.11 | 52.78 | 44.97 |
| Treatment | 26 | 58.81 | 62.06 | 52.88 | 59.81 | 48.00 |
| Spanish | | | | | | |
| Control | 49 | 31.07 | 43.82 | 38.25 | 42.86 | 43.00 |
| Treatment | 49 | 34.51 | 45.83 | 39.79 | 44.67 | 47.64 |
| TOTAL | 150 | | | | | |

^aMath Subtest 1: Concepts and Estimation; Subtest 2: Problem Solving and Data Interpretation; Subtest 3: Computation

The first ANOVA compares the performance of English speakers in the TWI program at the treatment school with English speakers at the control school, in answer to research questions three through six. Table 5 displays the results for English speakers; the ITBS percentile rank on each ITBS subtest was compared across schools. For this analysis, the case weighting function was used to render the sample size of each subgroup equal. The researcher conducted the ANOVAs in Table 5 and Table 6 with and without case weighting and found that case weighting resulted in slightly more positive results for Spanish speakers and English speakers in the treatment school, but made no difference in the overall significance of the results.

It can be seen in Table 5 that when comparing the English-speaking subgroups' ITBS national percentile ranks across the two schools, English speakers in the TWI program scored significantly higher than English speakers in the control school on both reading subtests. On the ITBS reading vocabulary subtest, the sum of squares (SS) = 1807.655, $F=3.771$, $df=1$, and $p=.029$ (one-tailed). When comparing the English-speaking subgroups' reading

comprehension ITBS percentile ranks across the two schools, the sum of squares (SS) = 2473.278, $F=4.359$, $df= 1$, and $p = .021$ (one-tailed). In answer to research question number three, there is a significant difference between the mean reading ITBS scores of English speakers in the treatment school and English speakers in the control school.

Table 5

One-way ANOVA of 2010 ITBS Percentile Rank by English Home Language Groups

| Dependent Variable | Groups | SS | df | MS | F | p^* |
|---|---------|-----------|------|----------|-------|-------|
| ITBS Percentile Rank Reading Vocabulary | Between | 1807.655 | 1 | 1807.655 | 3.771 | .029 |
| | Within | 23968.145 | 50 | 479.363 | | |
| | Total | 25775.800 | 51 | | | |
| ITBS Percentile Rank Reading Comprehension | Between | 2473.278 | 1 | 2473.278 | 4.359 | .021 |
| | Within | 28372.206 | 50 | 567.444 | | |
| | Total | 30845.484 | 51 | | | |
| ITBS Percentile Rank Math Concepts and Estimation | Between | 784.577 | 1 | 784.577 | 1.234 | .136 |
| | Within | 31787.502 | 50 | 635.750 | | |
| | Total | 32572.079 | 51 | | | |
| ITBS Percentile Rank Math Problem Solving and Data Interpretation | Between | 644.126 | 1 | 644.126 | 1.053 | .155 |
| | Within | 30591.886 | 50 | 611.838 | | |
| | Total | 31236.012 | 51 | | | |
| ITBS Percentile Rank Math Computation | Between | 119.323 | 1 | 119.323 | .198 | .329 |
| | Within | 30198.948 | 50 | 603.979 | | |
| | Total | 30318.271 | 51 | | | |

* $p < .05$, one-tailed

Regarding mathematics, no differences between English speakers in the TWI program and English speakers at the control school were noted. It can be seen in Table 5 that for ITBS subtest 1, mathematics concepts and estimation, the sum of squares (SS) = 784.577, $F= 1.234$, $df= 1$, and $p = .136$ (one-tailed), indicating no difference between English

speakers at either school. Likewise, for ITBS subtest 2, Problem Solving and Data Interpretation, the sum of squares (SS) = 644.126, F = 1.053, df = 1, and p = .155 (one-tailed), indicating no difference between English speakers at either school. In comparing the English-speaking subgroups' math computation ITBS national percentile ranks across the two schools, the sum of squares (SS) = 119.323, F = .198, df = 1, and p = .329 (one-tailed), again indicating no difference. The null hypothesis that that the mean mathematics ITBS percentile ranks for English speakers in the control school would be greater than or equal to the mean ITBS percentile ranks of English speakers in the treatment school cannot be rejected, since $p > .05$ on all three mathematics subtests (one-tailed). In answer to research question number four, the mean mathematics ITBS scores of English speakers in the TWI program are not significantly higher than ITBS scores of the English speakers at the control school.

An ANOVA was also conducted to test whether the difference between mean ITBS percentiles of the Spanish-speaking subgroups across schools was significant in both reading and mathematics. This test was conducted in response to research questions five and six. Case weighting was again used in the analysis to render sample sizes proportionate; this did not impact the overall significance of results. The results for Spanish speakers are presented in Table 6. The comparisons were made across schools.

Table 6**One-way ANOVA of 2010 ITBS Percentile Rank by Spanish Home Language Groups**

| Dependent Variable | Groups | SS | df | MS | F | p* |
|---|---------|-----------|----|---------|------|------|
| ITBS Percentile Rank Reading Vocabulary | Between | 290.405 | 1 | 290.405 | .709 | .201 |
| | Within | 39316.290 | 96 | 409.545 | | |
| | Total | 39606.695 | 97 | | | |
| ITBS Percentile Rank Reading Comprehension | Between | 98.701 | 1 | 98.701 | .201 | .328 |
| | Within | 47046.448 | 96 | 490.067 | | |
| | Total | 47145.149 | 97 | | | |
| ITBS Percentile Rank Math Concepts and Estimation | Between | 57.781 | 1 | 57.781 | .091 | .382 |
| | Within | 60750.838 | 96 | 632.821 | | |
| | Total | 60808.619 | 97 | | | |
| ITBS Percentile Rank Math Problem Solving and Data Interpretation | Between | 80.645 | 1 | 80.645 | .166 | .343 |
| | Within | 46673.210 | 96 | 486.179 | | |
| | Total | 46753.855 | 97 | | | |
| ITBS Percentile Rank Math Computation | Between | 528.125 | 1 | 528.125 | .707 | .202 |
| | Within | 71731.850 | 96 | 747.207 | | |
| | Total | 72259.975 | 97 | | | |

* $p < .05$, one-tailed

It can be seen in Table 6 that when comparing the Spanish-speaking subgroups' ITBS national percentile ranks in reading and mathematics across the two schools, there are no significant differences between the two subgroups. On the reading vocabulary subtest, the sum of squares (SS) = 290.405, F = .709, df = 1, and p = .201 (one-tailed), indicating no significant difference. When comparing the Spanish-speaking subgroups' ITBS percentile ranks in reading comprehension, the sum of squares (SS) = 98.701, F = .201, df = 1, and p = .328 (one-tailed). The null hypothesis that that the mean reading ITBS percentile ranks for Spanish speakers in the control school would be greater than or equal to the mean ITBS

percentile ranks of English speakers in the treatment school cannot be rejected, since $p > .05$ in both cases (one-tailed). Therefore, in answer to research question number five, there is no significant difference between the mean reading ITBS scores of Spanish speakers in the treatment school and Spanish speakers in the control school. The Spanish speakers in the TWI program had slightly higher mean scores, despite their lower PPVT scores (see Table 2), but no differences were significant.

In mathematics, it can be seen in Table 6 that when comparing the Spanish-speaking subgroups' ITBS percentile ranks for mathematics concepts and estimation across the two schools, the sum of squares (SS) = 57.781, F = .091, df = 1, and p = .382 (one-tailed). For the ITBS subtest Problem Solving and Data Interpretation, the sum of squares (SS) = 80.645, F = .166, df = 1, and p = .343 (one-tailed) indicating no difference in Spanish speakers' performance across schools. In comparing the Spanish-speaking subgroups' ITBS national percentile ranks in math computation across the two schools, the sum of squares (SS) = 528.125, F = .707, df = 1, and p = .202 (one-tailed). The null hypothesis that that the mean mathematics ITBS percentile ranks for Spanish speakers in the control school would be greater than or equal to the mean ITBS percentile ranks of Spanish speakers in the treatment school cannot be rejected, since $p > .05$ on all three mathematics subtests (one-tailed). Therefore, in answer to research question number six, there is no significant difference between the mean mathematics ITBS scores of Spanish speakers in the treatment school and English speakers in the control school.

Discussion

In this study, as in so many others where language-majority students are enrolled in immersion or dual language programs, the English speakers continue to perform on par with

their English-speaking peers on an assessment of English proficiency, the PPVT. In addition, their Spanish proficiency, while still far behind native proficiency levels, is nevertheless growing. Their performance on academic measures of reading and mathematics measures is the most impressive, however. The English speakers in the treatment school significantly outperformed their English-speaking peers at the control school on both reading subtests of the Iowa Test of Basic Skills (ITBS). These results are very promising, and indicate further rationale for promoting two-way immersion programs for majority-language students, particularly in a State where English speakers comprise almost 90 percent of the state student population (Iowa Department of Education, 2010).

For the language-minority students, in this study Hispanic/Latino children from a variety of ethnic and cultural backgrounds, the TWI program has not realized any increased proficiency gains in English, as measured by the PPVT. However, it is very interesting to note that their PPVT performance is nevertheless significantly correlated with their Spanish language proficiency, as measured by the TVIP. In addition, their TVIP scores are also significantly correlated with their ITBS scores, almost as much (and in one case even more) than their PPVT scores. While one could argue it is due to their being quite balanced bilinguals, their Spanish-speaking peers in the control school did not have any significant correlations between the TVIP and the ITBS. Both groups did have significant correlations between the PPVT and the ITBS. Therefore, just being bilingual doesn't necessarily cause a significant relationship between language proficiency and academic performance. In this study, only those Spanish speakers whose native language was being developed and supported through a bilingual program and was an integral part of their education demonstrated that relationship. It must also be mentioned that although the Spanish speakers

in the TWI program did not attain significantly different ITBS scores from the Spanish speakers in the control school, their mean ITBS scores were slightly higher than their peers at the control school—and this despite lower PPVT scores, overall.

In conclusion, the reader must be reminded that the students who formed the sample for this study were all extremely young and overall would demonstrate limited language proficiency and any other effects common to students with a low socioeconomic background (Hart & Risley, 2003; Walker, Greenwood, Hart, and Carta, 1994). The idea that native language proficiency positively influences second language proficiency is supported with the results from this study, and there is also support for Cummins' language interdependence theory that suggests that acquiring and perfecting certain concepts, skills, and knowledge in the native language can translate to increased ability to function similarly in the second language, as the Spanish speakers' ITBS scores would appear to indicate. More research concerning the long-term benefits of two-way immersion to both language-minority and language-majority students is needed to fully understand the bilingual construct and what it means for them. Language develops fully only after many years; this study, terminated prematurely, could only collect data from the beginning of the program and was limited in the scope of analysis due to sample size. More attention to the language proficiency held by students when they begin their schooling completes the picture of their growth over time, and only by following young children into middle or high school can educators ever know the extent of the impact of bilingual education.

Chapter Five: Conclusion

In Iowa, Hispanic language-minority students remain a minority across the state, comprising less than 4% of the state's population (Iowa Department of Education, 2010). In many districts or individual schools, however, they are a rapidly increasing percentage of the population (2010). In the schools where this research study was conducted, Hispanic language-minority students represented almost half of the entire student population. School districts across Iowa are struggling, as are many across the country, with the question regarding what type of program will educate these students successfully. English learners across Iowa, especially those of Hispanic or Latino descent, are performing behind their language-dominant peers on the state test for accountability, the Iowa Test of Basic Skills (ITBS).

This research project focused on one elementary school whose leaders and teachers have struggled with low-performing Hispanic English learners for a decade. Frustrated at the lack of success, they sought state assistance in implementing a program model relatively unique across the state, two-way immersion (TWI). The TWI program began in kindergarten in 2006 and has progressed up the grade levels over the last four years, moving into third grade for the 2009-10 school year. Last year marked the end of this study, due to a lack of continuation funding. Data were collected regarding student language development, attitudes, and academic achievement, but these were limited due to the brevity of the project. This was a major limitation to the study, since the most promising results of dual language programs are typically realized after the students have been in the program a minimum of five to seven years. However, this study determined to examine the effects of the two-way

immersion program on majority and minority students' language proficiency and academic progress, using the preliminary data available.

The study was conducted using a quasi-experimental research design. No random sampling or random assignment of participants was possible. A second elementary school with very similar demographic characteristics was selected from another area within the same district to serve as a control school. The building with the two-way immersion program was the treatment school. Parallel data were collected from each building to enable comparisons across treatment and control groups; further analysis was done by home language subgroup.

As with other research studies, the most significant factor in students' performance on any measure was their home language. Accordingly, the researcher compared the progress of students in the TWI program with those at the control school by home language group. In other words, English speakers' performance was compared with other English speakers, and likewise with Spanish speakers. Other variables such as gender and ethnicity were not found to be significant in terms of their effect on student performance (see Table 4 in Chapter Three).

The first study focused on students' performance on two standardized measures of language proficiency; the Peabody Picture Vocabulary Test-III (PPVT) and the Test de Vocabulario Imágenes Peabody (TVIP). Both measure the size of students' receptive vocabulary. This study showed that English speakers in the TWI program score significantly higher on the PPVT than their English-speaking counterparts at the control school ($p < .05$). Spanish speakers at the TWI program scored slightly below their Spanish speaking peers at the control school, but not significantly so, on the PPVT. They did, however, score significantly higher than Spanish speakers at the control school on the TVIP. In addition,

when the correlation between the PPVT and TVIP for each student was tested, only the Spanish speakers' scores at the treatment school were significantly correlated ($p < .05$). Although correlations demonstrate only that a relationship exists and do not test for causality, the finding is interesting in light of existing theory concerning the importance of language interdependence: that proficiency in one's first language is strongly predictive of proficiency in one's second language (Cummins, 1984; Cummins & Swain, 1986).

This second study examined the degree to which students' performance on the TVIP and PPVT related with their overall performance on the ITBS in reading and math. It also compared TWI students' performance on the ITBS with the control students' performance. All students' PPVT scores were significantly correlated with both reading and at least two mathematics subtest scores; both English speakers' and Spanish speakers' PPVT scores were positively correlated with vocabulary, reading comprehension, math concepts and estimation, and data analysis and problem solving. However, only the TVIP scores of Spanish speakers in the TWI program were likewise significantly correlated with their ITBS scores, on all subtests except math computation.

The latter finding indicates support for Cummins' theory regarding language interdependence (1986). Students' native language proficiency can indeed significantly correlate with their performance on second language tasks, but it appears only when the students are engaged in a form of bilingual education where they are actively acquiring and practicing concepts, skills, and knowledge in their native as well as in the target language. There were no significant correlations between the control school Spanish speakers' TVIP scores and their ITBS scores.

The final analysis of this second part to the study is a comparison of students' ITBS scores on two reading subtests and three mathematics subtests. Overall, English speakers in the TWI program significantly outperformed English speakers in the control school on both reading subtests, while Spanish speakers in the treatment program showed no significant difference in their scores when compared to the control school Spanish speakers. For English speakers, learning in Spanish for half of every day is no detriment to their overall academic performance and English language development, while improving their reading performance. For Spanish speakers, while their English development is slightly (but not significantly) behind their peers, their Spanish development seems to have a positively balancing effect on their academic performance, since their ITBS scores were slightly higher than the Spanish speakers at the control school for every subtest. This is even more surprising, given that PPVT scores are also significantly correlated with ITBS scores, and the TWI Spanish speakers consistently perform below their Spanish-speaking peers on the PPVT.

For all the students in the study, the TWI program serves an important role beyond just developing their language proficiency and their academic skills in all core areas. The TWI program represents an affirmation of all the students' unique linguistic, cultural, and ethnic backgrounds. Both schools are extremely diverse in ethnicity, overall. Language diversity, however, is something that is only appreciated and affirmed in the treatment school. Teachers in the control school are all monolingual, except for one first grade teacher, and their ability to fully assess students' language and cognitive development is hindered by their inability to converse with and evaluate the students in Spanish. In many cases, this can

mean the difference between recognizing a language barrier or misidentifying a child as learning disabled (Figueroa and Newsome, 2006).

At the treatment school, both language-majority and language-minority students are proud of their bilingual abilities. The professionals they see every day in their classroom are just like them: bilingual, biliterate, and bicultural. They themselves can perceive their cultural and linguistic diversity as normal, and in time, appreciate the economic edge being bilingual can give them.

As a researcher, this researcher appreciates not only the economic edge, but the advantages in self-esteem, identity development, as well as academic proficiency that the TWI program offers. The findings from this research project show only advantages to English speakers of the program, while Spanish speakers are performing on par with their peers at the control school—there are certainly no disadvantages for them in developing their first language alongside English. If anything, this researcher expects a return on this investment in the long-run, with interest, if the TWI students' English proficiency develops as strongly as their Spanish proficiency has in just these first few years. However, more long-term research is needed to measure that return of the TWI program and to fully appreciate the bilingual skills of both the language-majority and language-minority students and the impact those skills will most likely have over the next eight years on their academic performance.

What does all this mean, then, for parents, teachers, administrators, and state legislators? The size of this study limits its generalizability to a national or international population, but findings are congruent with other, larger research studies and it is certainly applicable to the Midwest region in which it was conducted. For English speakers in two-

way immersion programs, regardless of their economic background, involvement in a program that uses English only half of the time for content instruction has no negative impact on their English language proficiency, and a decidedly positive impact on their reading skills, as measured by a norm-referenced, standardized assessment. Indeed, the two-way immersion program appears to serve as enrichment for English-speaking students in the dominant culture. For Spanish-speaking English learners, receiving half of their instruction in Spanish appears to relate significantly and positively with their English proficiency development and has no negative impact on their overall academic performance. They perform slightly ahead of their Spanish-speaking peers in an English-only program on all subtests of the ITBS. There was no disadvantage for any of the students in being enrolled in a bilingual, two-way immersion program, and a distinct advantage for English speakers. For Spanish-speakers in the TWI program, their Spanish language proficiency was positively and significantly correlated with their ITBS performance in reading and math—a strong indicator that maintaining their native language has a strong positive effect on their academic performance, even when that performance is measured entirely in English.

For economically-disadvantaged primary students, learning in a bilingual environment shows great promise in leveling the playing field for these culturally and linguistically diverse students and may be a program model that will give at-risk students an edge over other students from similar backgrounds. Data such as these must be considered in making decisions regarding what types of programs are most likely to benefit English speakers and English learners alike. The question should not be Why do it? but rather, Why NOT do it? Benefits accrue to both language groups and two-way immersion programs can only serve to improve cross-cultural understanding, appreciation, and tolerance. Being

bilingual is never a disadvantage; indeed, this study suggests it is an advantage both in developing English skills for English speakers and in attaining higher student achievement on academic measures for both English and Spanish speakers.

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Appendix A

Bilingual: In this study, a term used to describe students who have oral proficiency in two languages.

Balanced bilingual: In this study, a term used to describe a student who demonstrates equal, or balanced, proficiency in two languages. Also referred to as *simultaneous bilinguals*.

Biliterate: A term used to describe someone who can read and write in two languages.

Dual language: a type of educational program that endeavors to deliver instruction in two languages for the purpose of developing bilingualism/biliteracy. Dual language programs are additive bilingual in approach, foster the development of cross-cultural skills, affirm students' heritage language and culture, and hold students to the same academic standards as monolingual programs.

EL or ELL: English learner or English language learner. This term refers to a student who is learning English in addition to their native or first language. English may or may not be their second language (could be their third, fourth, etc.); this term is used for any English learner in any type of program, English only or dual language.

ESL: English as a Second Language. Term used to describe programs that teach English as an additional (formerly "foreign") language.

Ideational fluency: demonstrating verbal control of concepts and ideas.

L1 or L2: L1 is used for a person's first (or native) language; L2 is used for a second (or weaker) language, typically in the process of being learned or acquired.

Language-minority: Adjective describing someone whose native or first language is not the socially dominant language. In the U.S. and Canada, English is the majority language;

therefore, speakers of other languages are members of a language-minority group. Used to describe English learners.

Limited English Proficient (LEP): a common term in education that refers to students whose English is not “native” or adequate. Another term for English learner; in this study, LEP is studiously avoided due to the suggestion of a deficiency on the part of the learner.

Linguistically diverse: Term used to describe a group of individuals that are representative of more than one language group, typically minority languages. Likewise, “culturally diverse” refers to representatives of more than one culture, “ethnically diverse” refers to representatives of more than one ethnicity or race.

Metalinguistic skills: Students’ ability to think about language, conceptually, from an analytic standpoint. This term indicates the ability to correct or adjust language from conceptual knowledge or a cognitive/explicit understanding of the language’s system and form.

Morphosyntactic knowledge: understanding the order and structure of morphemes, or the smallest grammatical units of a language. Morphemes can be parts of larger words but are themselves intact units.

Phonology: the study of phonemes, which are the basic units of speech sound in a language system.

Phonological awareness: Demonstrating an understanding that written forms of language correspond with discrete sounds, which result in language.

Proficiency: Skill level or ability, usually used in conjunction with “language” to describe students’ ability to talk, understand, read, and/or write the language. Can refer to the native (L1) or second (L2) language.

Two-way immersion: A type of dual language program where the student population is representative of two language groups, most often Spanish- and English-speaking. Balance between the two language groups is maintained at 50%-50% to 70%-30%.

BIOGRAPHICAL SKETCH

Holly Janelle Poston Kaptain was born November 12, 1968 in Mesa, Arizona. She graduated Cum Laude with a Bachelor of Arts Degree from St. Olaf College in 1990 and a Master of Science degree from Iowa State University in 2007. She worked as a Spanish and German teacher in public schools in Iowa for six years and was awarded the elementary foreign language teacher of the year award in 1996.

She has served as a Research Assistant at the National K-12 Foreign Language Resource Center at Iowa State University for five years, and was the Project Coordinator for the Two-Way Immersion research project. Dr. Kaptain's research interests include effective instruction for language-minority and at-risk students, curriculum design and development, and bilingual or multilingual program implementation.