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The Effects of Sign Language on Second Language Acquisition

An Action Research Report

by Itzel Mejia-Menendez

The Effects of Sign Language on Second Language Acquisition

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Abstract

This action research project examined the effects of sign language on the ability of primary students to learn new Spanish vocabulary in a bilingual Montessori classroom. The research took place at a public charter Montessori school in Washington, District of Columbia. Twenty-seven primary school aged children were included in this seven-week study. Sources of data collection included a parent-teacher questionnaire, a baseline assessment, daily observation logs, a daily checklist, a weekly journal, and a summative assessment. Students were grouped by Spanish fluency and taught eight different vocabulary words in Spanish. Half of the words were taught alongside a sign in American Sign Language and the other half were taught without an accompanying sign. The summative assessment data showed that students of all ages displayed a significant increase in their ability to recall new Spanish vocabulary words that were introduced with an accompanying sign in American Sign Language. Future research could examine the roles of sign language and gesturing in helping children recall vocabulary in the long-term.

Keywords: Montessori, sign language, gesturing, American Sign Language, Spanish, second language acquisition, dual language programs, bilingual, vocabulary, short-term memory

This Action Research Project took place in a bilingual primary Montessori classroom with 27 children ages three to six years old. The classroom was led by a bilingual teacher and a Spanish-speaking teaching assistant. There were 10 five-year-old Kindergartners, 10 four-year-old pre-Kindergartners, and seven three-year-old preschoolers in the classroom. The students in the classroom represented a variety of physical and language abilities. All students were hearing children. All children were included in the small and whole group interventions for this study, regardless of their physical or language abilities.

The classroom where this study took place was part of a bilingual public charter school attended by children in grades preschool through fifth grade in English and Spanish. Twenty-two out of 27 children in the classroom were native English speakers. Five children were native Spanish speakers and classified as English Language Learners (ELLs). All of the children in this primary classroom were primarily instructed in Spanish, regardless of their native language or language preference. The students were considered second language learners within a 90-10 two-way dual language program due to their language abilities and the type of language instruction the children received (Christian, Howard, & Loeb, 2000; Cook, 2002; Gomez, Freeman, & Freeman, 2005). The classroom used a two-way dual language program because the student population was comprised of native English and Spanish speakers. The classroom used a 90-10 model to primarily teach Spanish since the majority of the students spoke English.

This Action Research Project arose out of my experience with teaching children sign language during the 2015-2016 school year. While the majority of the instruction that year was in Spanish, I also introduced a few signs from American Sign Language to the children in my classroom. I had 26 native English speaking children and three native Spanish speaking children. I decided to use three signs in American Sign Language with the hopes that we would be able to

silently communicate during group meetings. The three signs I introduced were: “bathroom,” “water,” and “walk.” After a couple of weeks, I noticed that the signs became very popular with the youngest children. This inspired me to study the effects of sign language and gestures on second language acquisition during the 2016-2017 school year.

The resulting Action Research Project set out to examine whether individual signs from American Sign Language could support children in learning new Spanish vocabulary. Most research into the intersection of sign language and language development had been with non-hearing children or hearing children with disabilities (Brereton, 2010; Petitto et al., 2001; Toth, 2009). A few researchers had focused on the effects of signing and hearing children without disabilities (Daniels, 2004; Good, Feekes, & Shawd, 1993; Larson & Chang, 2007). Those studies focused on sign language as a strategy to promote a positive classroom culture, support language learning, and improve literacy.

Research into the effects of sign language with non-hearing children is plentiful (Brereton, 2010; Petitto et al., 2001; Toth, 2009). Research, however, is much more limited on the impact of sign language on hearing children (Daniels, 2004; Good et al., 1993; Larson & Chang, 2007). This Action Research Project added to the limited pool of research studying the effects of sign language on the language development of hearing children without disabilities, and could be the first of its kind to study the role of sign language as a strategy for young hearing children to learn vocabulary in a second language.

The Review of the Literature that follows examines the intersection of gesturing, American Sign Language, and second language acquisition. Specifically, it examines the ways that gesturing and sign language can improve language development, support students and teachers, and support young children as they learn a second language. The Review of the

Literature and subsequent sections of this project will address the following Action Research

Question: What effects will sign language have on the ability of children to acquire new Spanish vocabulary in a bilingual primary Montessori classroom?

Review of Literature

This literature review will first define the major terms used in gesturing, American Sign Language, and second language acquisition. The review will then use current research to examine the benefits of sign language as a method for promoting a positive classroom culture and a classroom management technique. Next it will discuss how sign language and gesturing can benefit language development. It will follow with a discussion on the current research on the effects of sign language and gesturing on short-term memory. Finally, the review will discuss the impact of signing and gesturing on the verbal expression of children in multilingual and preschool classrooms.

Second Language Acquisition, Gesturing, and American Sign Language

Second language acquisition is a field of inquiry that began before the early 1960's (Myles, 2010). It refers to the learning of a non-native language and is a process that occurs sometime after learning a native language has begun (Myles, 2010; Wang, 2015). An individual learning a second language is either a second language learner or a second language user (Cook, 2002). Second language learners acquire a second language for later use, such as students taking Spanish as an elective (Cook, 2002). Second language users know and use a second language at any level, immediately applying what they know to real-life situations (Cook, 2002). Second language learners and users acquire language in many settings, including formal instruction in a classroom. The Spanish-English Coral Way program in Florida, and the French-English Ecole

Bilingue in Massachusetts were the first dual language programs to be implemented in the United States in the 1960's (Gomez et al., 2005).

Dual language education programs, two-way bilingual education, two-way immersion, dual immersion, and enriched education are the terms scholars use to refer to language programs where students acquire a second language (Gomez et al., 2005). While dual language programs are called by different names, involve different target languages, and reach different student populations, they are usually comprised of native English speakers and native speakers of another language (Gomez et al., 2005). Ninety-10 and 50-50 models that are classified as one-way and two-way dual language programs are the only bilingual education programs that have been proven to assist students to reach and maintain 50th percentile academic achievement in both the first and second language (Gomez et al., 2005). One-way programs are those in which students who speak the same language learn through two languages (Gomez et al., 2005). For example, a classroom in which native English speakers are learning English and Spanish would be considered a one-way dual language program. Two-way programs are those in which students from two language groups learn through two languages (Gomez et al., 2005). For example, a classroom in which native English speakers and native Spanish speakers are learning both English and Spanish would be considered a two-way dual language program.

American Sign Language or ASL is the third most commonly used language in the United States (Daniels, 2004). ASL is a complex language that is completely separate and distinct from English (National Institute on Deafness and Other Communication Disorders [NIDCD], 2015). ASL uses signs that are made by moving the hands (NIDCD, 2015). These hand movements are combined with facial expressions and postures of the body (NIDCD, 2015). ASL also uses a combination of gestures and rules for generating grammatically sound

phonological, morphological, and syntactical structures (Daniels, 2004). ASL is one of several communication options used by individuals who are deaf or hard-of-hearing (NIDCD, 2015).

The term “sign language” is not limited to specific signs, but rather can involve gesturing, pantomime and other non-spoken communication methods to convey ideas, language, and vocabulary (Toth, 2009). Research suggests that there is a strong relationship between gesturing and verbal language development (Behne, Carpenter, & Tomasello, 2014; Foraker, 2001; Goldin-Meadow, 2007; Stanfield et al., 2014). Gesturing is a vital part of all communication and is an important part of language learning (Foraker, 2011). Behne et al. defined gesturing as a spontaneous hand movement that depicts something that the speaker is communicating (p. 2049). Senghas, Kita, and Ozyurek (2004) demonstrated that early gesturing can transform into more complex linguistic systems. Gesturing, therefore, should also be considered when studying the benefits of signing in second language acquisition. The following sections will discuss how sign language and gesturing can contribute to a positive classroom culture, serve as a classroom management tool, improve language development, improve short-term memory, and help students with verbal expression within multilingual preschool classrooms.

Sign Language and Classroom Management and Culture. Several researchers have discussed the benefits of signing as a strategy to support a positive classroom culture and as a classroom management technique (Brereton, 2010; Daniels, 2004; Good et al., 1993). Daniels (2004) examined the effects of sign language on the receptive English vocabulary of 41 hearing Kindergarten students. There were 21 students in the experimental group and 20 students in the control group. Teachers successfully redirected the students in the experimental group without interrupting group lessons, thereby demonstrating that signing is a successful classroom management technique (Daniels, 2004). Good et al. (1993) also discussed the benefits of sign

language for classroom management. They argued that students and teachers using sign language could communicate from across the room, allowing for seamless redirection and a preservation of the academic atmosphere of the classroom (Good et al., 1993).

Brereton (2010) also suggested that sign language could support a positive classroom culture. Brereton (2010) studied the effects of sign language in an inclusive classroom with hearing and non-hearing children ages four to 12 years old. An inclusive classroom is a classroom that serves children with and without disabilities (Brereton, 2010). Brereton (2010) argued that signing helped establish an inclusive community supportive of all learning abilities. The teachers in the study used sign language as an example of diversity in a lecture to students (Brereton, 2010). They promoted a positive and inclusive classroom culture by modeling how language is used differently by different people (Brereton, 2010). Good et al. (1993) also supported the argument that signing supports an inclusive classroom by stating that teaching sign language “facilitated the mainstreaming of hearing-impaired children” (p. 81).

In addition to supporting a positive classroom culture, sign language can also support redirection as classroom management technique (Brereton, 2010). Brereton (2010) offered one example of the effectiveness of signing as a redirection strategy. Brereton (2010) described a teacher who was able to redirect a child while simultaneously giving a lesson to another student. She signed, “Stop. Get down please. That is not a safe place to stand” (Brereton, 2010, p. 94). In this example, students and teachers were able to communicate and interact positively with one another without disrupting the lesson (Brereton, 2010).

Brereton (2010) also argued that signing promoted interpersonal learning. She suggested that imperfect signing, which would likely occur with such young signers, provided teachable moments in the classroom (Brereton, 2010). For example, when classroom teachers in the study

were unable to decipher illustrated signs, they would look up the answers (Brereton, 2010). The teachers were unknowingly modeling to the students how to use the signing dictionary or seek help from an expert (Brereton, 2010). Brereton (2010), Daniels (2004), and Good et al. (1993), therefore, substantiated the ability of sign language to promote a positive classroom culture and help teachers manage their classroom.

Sign Language and Language Development. Many researchers have discussed the benefits of sign language in promoting language development (Brereton, 2010; Daniels, 2004; Good et al., Petitto et al., 2001). According to Daniels (2004), French philosopher Etienne Condillac was the first to suggest a link between signing and language development in 1775. Condillac suggested that signing was an effective method for the instruction of hearing children (Daniels, 2004). Daniels (2004) also mentioned the work of Thomas Hopkins Gallaudet, founder of Gallaudet University and a pioneer in deaf education in the United States. Gallaudet believed that sign language would increase hearing children's vocabulary and language proficiency (Daniels, 2004). The notion that sign language and language development are linked, therefore, is not new (Daniels, 2004).

Petitto et al. (2001) more recently suggested a relationship between sign language and language development. Petitto et al. (2001) argued that sign language can have a positive effect on the language development of children. They examined the effect of sign language as a language learning strategy for hearing children, specifically how two types of student populations acquired a second language. Petitto et al. (2001) compared the ability of one group of children learning sign language and French to a second group of children learning English and French. The children in this study were learning the Langues de Signes Quebecoise (LSQ) or Quebecoise Sign Language (Petitto et al., 2001). This variant of sign language has a different

syntactical structure to American Sign Language but still heavily uses gestures. Petitto et al. (2001) established that the three LSQ-French students were able to positively exploit the modality possibilities that sign language provided. All the students in this study reached their language milestones during the expected time frames (Petitto et al., 2001). The results of this study demonstrated that learning a second language will not negatively impact language development but rather can support a typical language development (Petitto et al., 2001).

Daniels (2004) also examined the relationship between sign language and language development. Daniels (2004) studied the effect of signing on the language abilities of hearing children in a kindergarten classroom. Daniels (2004) described how signing the 26 handshapes of the American Manual Alphabet promoted phonological awareness by providing students a new way to isolate the sounds and names of the letters in the English alphabet. Daniels' research also showed that signing could considerably increase a kindergarteners' vocabulary since "students gained a full two years of vocabulary growth during the nine-month program" (Daniels, 2004, p. 95). Signing can, therefore, positively impact language development through vocabulary learning and support of phonological awareness skills (Daniels, 2004).

Brereton (2010), Daniels (2004), and Good et al. (1993) also pinpointed the reason why sign language can improve language skills. They observed that sign language can help children learn a new language because it is a kinesthetic, manual-visual learning strategy (Brereton, 2010; Daniels, 2004; Good et al., 1993). Good et al. (1993) stated that "sign language is kinesthetic, combines abstraction with concrete muscle movement and provides a bridge for learning for children in the preoperational stage of development" (p. 82). Signing encourages the use of sight and touch, allowing children to employ multiple intelligences when children are learning a new language (Brereton, 2010; Good et al., 1993). Brereton (2010) argued that children learning a

second language benefit from being bimodal. Students learning a second or foreign language, such as Spanish, traditionally would be using vocal-aural learning strategy (Brereton, 2010). Children learning a second language would benefit from using a different modality, such as sign language which uses a manual-visual learning strategy, because it allows the brain to process the new information through two different formats (Brereton, 2010). Signing allows children to see, hear and feel the words (Brereton, 2010), allowing a kinesthetic path for remembering new vocabulary. Since children have a natural tendency to gesture, signing in a bilingual classroom can, therefore, help with language development by increasing vocabulary retention and language expression. The next sections in the literature review will discuss these benefits in detail.

Sign Language, Gestures, and Memory. Larson and Chang (2007) examined the effects of sign language on short-term memory. Their study tested the ability of 28 children to recall the adjectives in a short book (Larson & Chang, 2007). Researchers read a story to 14 students in the control group. They did not use signs while reading the story. Researchers then read the same story to 14 students in the experimental group. Researchers used signs alongside every adjective when reading to the experimental group. The experimental group remembered more adjectives than the control group, but not enough to be statistically significant (Larson & Chang, 2007). This study demonstrated that an increased short-term memory is one of the possible benefits to signing for hearing children (Larson & Chang, 2007). The authors also suggested that dramatic tone intonation and dramatic sign language could increase preschoolers' short-term memory (Larson & Chang, 2007). This study suggests that a combination of dramatic tone and gesturing can impact the ability of children to recall targeted words (Larson & Chang, 2007).

Stanfield et al. (2014) also examined the relationship between gestures and memory. They demonstrated that children use gestures as a way to remember new words by observing that

preschoolers have the capacity to link iconic gesturing to the meaning of objects (Stanfield, 2014). These findings supported their initial hypothesis that a comprehension of iconic gesture and speech combinations emerges around the same time that children produce iconic gesture and speech combinations (Stanfield et al., 2014). According to Reynolds (1995) and Brereton (2010), there are physical limitations for primary aged or preschool students to replicate the nuances of many signs. These restrictions, however, do not mean that preschoolers cannot effectively learn and correctly employ their variations on the signs (Reynolds, 1995). Reynolds (1995) argued that children can establish a beneficial connection between signing and muscle memory regardless of imperfect signing. Preschoolers, therefore, can most benefit from signing by beginning at age three (Reynolds, 1995). A primary classroom that serves children ages three to six, therefore, would be an ideal place to introduce signing with the purpose of second language acquisition.

Sign Language, Gestures, and Verbal Expression in a Multilingual Context. Signing in a multilingual or bilingual context is supported by Lantolf's 1994 research into the role of scaffolding in language learning (as cited in Myles, 2010). Current research supports sign language as a strategy to support Spanish language acquisition (Broaders et al., 2007; Goldin-Meadow, 2007; Good et al., 2003; Toth, 2009).

Good et al. (1993) argued that a multilingual classroom is an ideal setting for signing since sign language can function as a common language for all students and teachers. Signing offers children unlimited opportunities for language expression (Broaders et al., 2007; Goldin-Meadow, 2007; Good et al., 2003; Toth, 2009). Signing establishes referential gestures that transcend language barriers (Good et al., 1993). Toth (2009) demonstrated that hearing children with and without disabilities benefited from signing when used as a communication tool.

According to Goldin-Meadow (2007), in the early stages of first language acquisition, gesturing occurs naturally and is used mainly as an “assist into the language system, substituting for words that the child has not yet acquired” (p. 744). Children who have already learned a first language have a tendency to gesture when they are at a loss for words or when a speaker is grappling with “ideas they are having difficulty expressing in speech” (Goldin-Meadow, 2007, p. 744). Signing and gesturing could, therefore, support verbal expression in children who are learning other languages.

Broaders et al. (2007) also demonstrated that sign language could help children with their verbal expression. Broaders et al. (2007) argued that gesturing allows young children to express implicit knowledge. They conducted two studies on the use of gesturing as a means to explain strategies for solving mathematics problems (Broaders et al., 2007). Broaders et al. (2007) argued that “forcing speakers to gesture seems to encourage them to produce information in gesture that is not found in their speech” (p. 547). The increased verbal expression was especially evident when the children encountered problem-solving strategies that they did not know how to explain (Broaders, 2007). Gesturing can, therefore, help young children express implicit knowledge and can also support verbal expression in children who have not yet mastered oral expression of a second language (Broaders et al., 2007).

Stevanoni and Salmon (2005) also examined the link between gesturing and verbal expression. They argued that gesturing increased event recall (Stevanoni & Salmon, 2005). In their 2005 study of 60 six and seven-year-old children, the researchers discovered that children who were asked to gesture while describing events were able to convey significantly more information than their non-gesturing (or gesture-limited) peers (Stevanoni & Salmon, 2005). This research study suggests that gesturing could also improve event recall and, therefore,

support language learning and verbal expression (Stevanoni & Salmon, 2005). Current research demonstrates that sign language and gesturing can improve verbal expression in children, thereby supporting the use of sign language as a strategy to teach a second language to young children (Broaders et al., 2007; Good et al., 1993; Goldin-Meadow, 2007; Stevanoni & Salmon, 2005; Toth, 2009).

Current research on the intersection of sign language and language development supported further investigation into the benefits of signing as a strategy to support second language acquisition in preschool aged children. This literature review demonstrated that signing can also promote a positive classroom culture and can be used as a classroom management technique (Brereton, 2010; Daniels, 2004; Good et al., 1993). The review also substantiated the positive relationship between sign language and language development (Brereton, 2010; Daniels, 2004; Good et al., 1993; Petitto et al., 2001). Finally, current research supported the setting for this Action Research Project as it demonstrated the benefits of sign language and gesturing on short-term memory and verbal expression (Brereton, 2010; Broaders, 2007; Good et al., 1993; Goldin-Meadows, 2007; Larson & Chang, 2007; Myles, 2010; Reynolds, 1995; Stanfield et al., 2014; Stevanoni & Salmon, 2005; Toth, 2009). The subsequent sections of this project will continue to address the Action Research Question: What effects will sign language have on the ability of children to acquire new Spanish vocabulary in a bilingual primary Montessori classroom?

Methodology

My school administrators granted permission for this study before the end of the 2015-2016 school year. I sent an active assent form to the parents of new students one week before the New Student Orientation on August 26, 2016. Parents were given an opportunity to opt-out of

the research and decline participating in the study during their New Study Orientation appointment. All seven new families assented to participating in the study. All 27 families in the classroom were also sent an assent form and given an opportunity to opt-out of the research and decline to have their child's data used in the study. All 27 families assented to having their child's data used in the study. I used the following four types of data gathering tools during the first two months of school: inquiry data, baseline and summative assessments, observational data, and artifacts.

The tools that I used to collect inquiry and baseline data were: a parent-teacher questionnaire (Appendix A) and a baseline assessment (Appendix B). Since new students seldom spoke during New Student Orientation appointments, I decided to evaluate my three-year-old preschool students through a parent-teacher questionnaire. I assessed my four-year-old pre-Kindergarten students and five-year-old Kindergarten students directly through a baseline assessment since they were returning students. I had established a relationship with these students and therefore they were more likely than their three-year-old peers to answer my questions.

I began data collection for my project on August, 26, 2016 during the New Student Orientation appointments. All new families had a 20-minute time frame to visit the classroom and conference with me. The parent-teacher questionnaire took only five minutes and allowed me to gain knowledge of the student's language preference and exposure to American Sign Language (ASL) and Spanish. I prepared a list of 20 Spanish words and 20 ASL signs and asked each set of parents if they thought their child had ever heard and or used any of the words and signs. I used this questionnaire to establish whether the incoming preschool students spoke Spanish and determine whether they had ever been exposed to sign language. I used the results

of the questionnaire to modify the word list I had created specifically for my incoming preschool students. I created a total of three Spanish word lists, one for each of the grades in my classroom. I translated all the words to English and found their corresponding sign in ASL.

The word list designed for preschool students contained Spanish words that I usually focused on in the first month of school. The second word list was intended for pre-Kindergarten students and contained Spanish words that were slightly more advanced. I thought all my pre-Kindergarten students would be best suited to learn words on this second vocabulary list since all of the pre-Kindergarten students had been in my classroom the previous year. The third and final list contained Spanish words that were very advanced and were paired with signs in ASL that were more difficult to duplicate. I thought that all of my Kindergarten students would be best suited to learn words on this third list for a variety of reasons. The first reason was that nine out of ten of the Kindergarten students were in my classroom last year and I was more familiar with their level of Spanish. Secondly, I thought these words were too difficult for the younger children since previous students have struggled with defining these words.

The second type of data gathering tool was a baseline assessment for pre-Kindergarteners and Kindergarteners. I collected baseline data during the first two weeks of school. Nineteen out of 20 students were returning students and therefore had previous exposure to ASL and to the Spanish language. The new Kindergarten student had previous exposure to Spanish but none to ASL. I used the baseline assessment to determine the Spanish language and ASL fluency of 10 pre-Kindergarteners and ten Kindergarteners. I was able to determine which words and signs the students did or did not know.

I first realized that I needed to modify my project after discovering at the New Student Orientation appointments that three of the seven incoming preschoolers were native Spanish

speakers. Only four of the incoming preschoolers were native English speakers and had no or very limited previous exposure to Spanish. The three native Spanish speaking preschoolers would need exposure to a different and more advanced set of Spanish words than their native English speaking peers.

The baseline assessment was the second data source to suggest I needed to reformat my student groupings. One pre-Kindergarten student and one Kindergarten student had demonstrated a very limited Spanish vocabulary compared to their peers during the baseline assessment. Those students would therefore benefit from learning more basic Spanish vocabulary words. I also noted that most of the pre-Kindergarten and Kindergarten students knew more than half of the Spanish words on the respective assessments for their age. Three Kindergarten students and one pre-Kindergarten student knew the English translation for almost all 20 words on the assessment. I would therefore need to rethink the format of my student groupings and include more advanced vocabulary since a majority of my returning students knew more Spanish than I expected.

I decided to group all students by Spanish fluency and not grade level following an analysis of the inquiry and baseline data. I then created new Spanish vocabulary lists for the most advanced students and all returning students. The Blue/Azul group replaced the original Kindergarten group. All of the Spanish vocabulary words on this word list now came from the Spanish-language *Indicadores Dinámicos del Éxito en Lectura* (IDEL) test, known as the Dynamic Indicators of Basic Early Literacy Skills test or DIBELS test in English. The original list only contained a handful of words from this test. IDEL is a research-based formative assessment that assesses the basic early literacy skills of students learning to read in Spanish (University of Oregon Center on Teaching and Learning, 2016). I chose Spanish vocabulary

words from the IDEL test since my Kindergarten students would be tested on their ability to construct sentences using these words later on in the year. I added the three native Spanish speaking preschool students and one native Spanish speaking pre-Kindergarten student into the newly formed Blue/Azul group. A total of 13 students were in this advanced group. Ten students were placed in the Green/Verde group. This group contained one Kindergarten student and nine pre-Kindergarten students. Half of the Spanish words on the word list for this group came from the IDEL test. All four of the native English speaking preschool students and one pre-Kindergarten student were placed in the Red/Rojo group. The Spanish words and signs in ASL they learned were the same words and signs I had originally designated for all the incoming preschoolers. The Red/Rojo group was the only word list that I did not modify.

Each of the new targeted word lists had eight Spanish vocabulary words (Appendix C). Four Spanish words were paired with a sign in ASL and taught together. Four Spanish words were taught without a sign or gesture. I taught the words on these lists over the course of a five-week window for 21 school days. I used small and whole group lesson instruction to ensure that all 27 students reviewed the Spanish words on their respective lists for at least five minutes each day.

I collected observational data by using a daily checklist (Appendix D) over the course of five weeks. I sat down for ten minutes every day during the morning work cycle and tallied each time I saw a student say the targeted word, sign the targeted word, or both. I modified the daily checklist following the first two days of data collection after realizing that the original daily checklist did not allow me to specify which of the targeted words were being used by students. I used the modified daily checklist for the remainder of the study (Appendix E).

I also collected a daily observational log (Appendix F) over the course of five weeks. This log allowed me to record the daily classroom climate so that I could note any environmental factors that could potentially impact the interventions and data collection. I used this log to keep track of any changes in routine, weather, and other general observations. I filled out this log every day after dismissal.

I kept a weekly self-assessment journal (Appendix G) to record my impressions of how the intervention was going. This journal allowed me to collect observational data and record whether I was collecting all the necessary data for my project. The study was designed to measure the effects of a sign language intervention over the course of four weeks or 20 school days. I extended the intervention window to five weeks after realizing that I had lost four days of instruction due to unforeseen changes in the school's calendar. I stopped targeted word instruction on Friday, October 22, 2016 and I collected the results of the sign language intervention through a summative assessment which evaluated all students on their ability to define the words on their targeted word lists. I completed data collection on Wednesday, October 26, 2016.

Analysis of Data

This project was originally designed with a smaller group of native Spanish speaking students in mind. During the 2016-2017 school year, however, I had many more native Spanish speaking students than in past years.

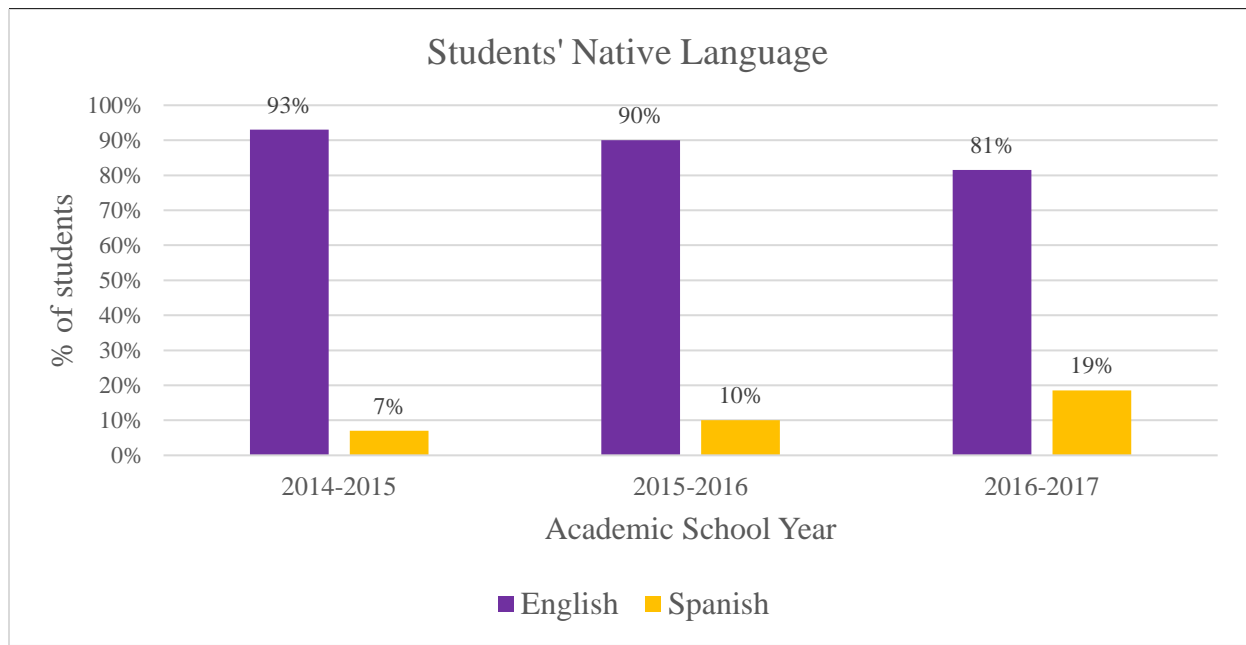


Figure 1. Students' native quantified. Each bar represents the percentage of students whose native language was English or Spanish.

Figure 1 displays the native language of students in my classroom over the last three academic years. Figure 1 demonstrates that the number of native Spanish speakers nearly doubled from the 2015-2016 school year to the 2016-2017 school year, and nearly tripled from the 2014-2015 school year. Twenty out of 27 students were returning students. While the majority were native English speakers, they all were part of the school's 90-10 two-way dual language program last year. Eighty-one percent of students in the classroom had a pre-existing knowledge of Spanish. This number includes returning students and the incoming native Spanish speaking preschoolers. While this percentage is high, the majority of the students still preferred to speak English. I began to look at the students' exposure to sign language with this slight increase in the number of Spanish-speaking students in mind.

Figure 2 shows whether students had any prior exposure to sign language and if so whether they were exposed to sign language in or out of the classroom. Nine out of 10

Kindergarten students and all 10 pre-Kindergarten students had prior exposure to sign language. These students were exposed to ASL in the classroom since they were my students last year. Only one pre-Kindergarten student was also exposed to ASL at home. Two of the preschool students were exposed to signing at home prior to enrolling in the classroom and five of the preschool students had no prior exposure to sign language. Seventy-eight percent of students in the classroom had a pre-existing knowledge of sign language. The baseline use of sign language and Spanish in my classroom was higher than might be expected in other primary Montessori classrooms.

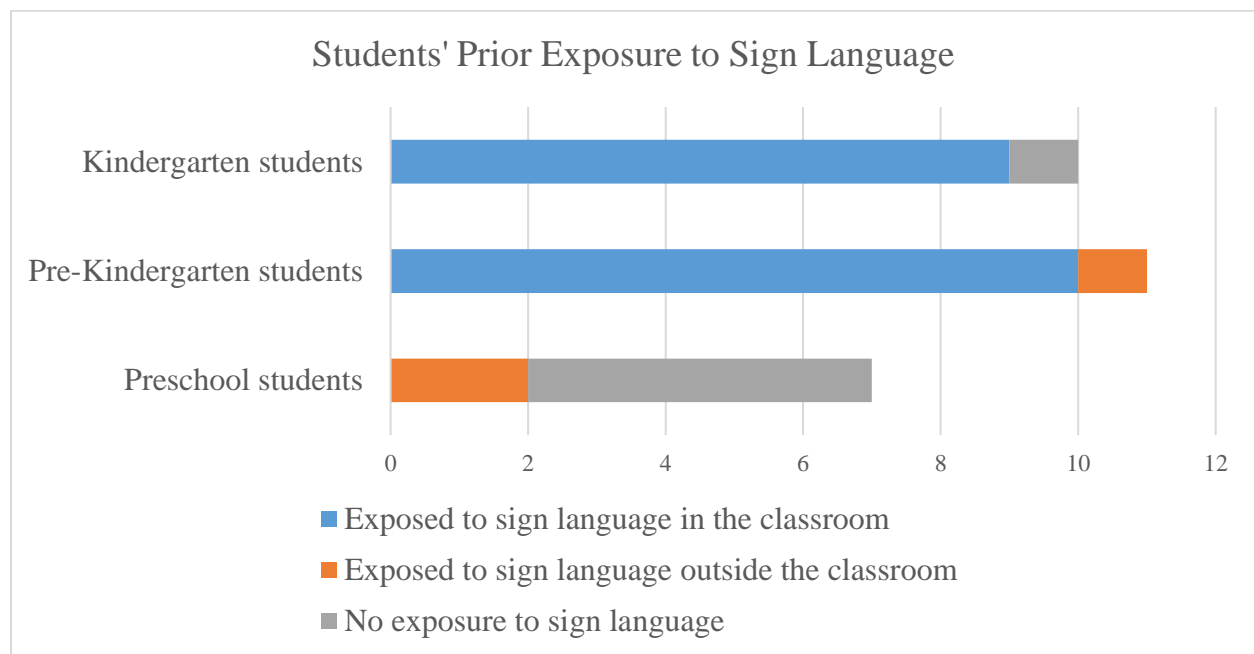


Figure 2. Students' prior exposure to sign language quantified. Each bar represents the type of exposure each student had prior to the data collection for this Action Research Project.

I kept a daily checklist to record the students' use of targeted sign language and words. Figures 3 and 4 display these records below. Figure 3 displays the number of times a week a student signed a word on their list during each week of the intervention window. All students were grouped by Spanish fluency. All of the incoming students with little to no exposure to sign

language and Spanish were in the Green/Verde group. Most of the returning students were in either the Red/Rojo group or Blue/Azul group. The students with the highest Spanish fluency were in the Blue/Azul group. Each list had four words that were taught with an accompanying sign and four words that were taught without a sign.

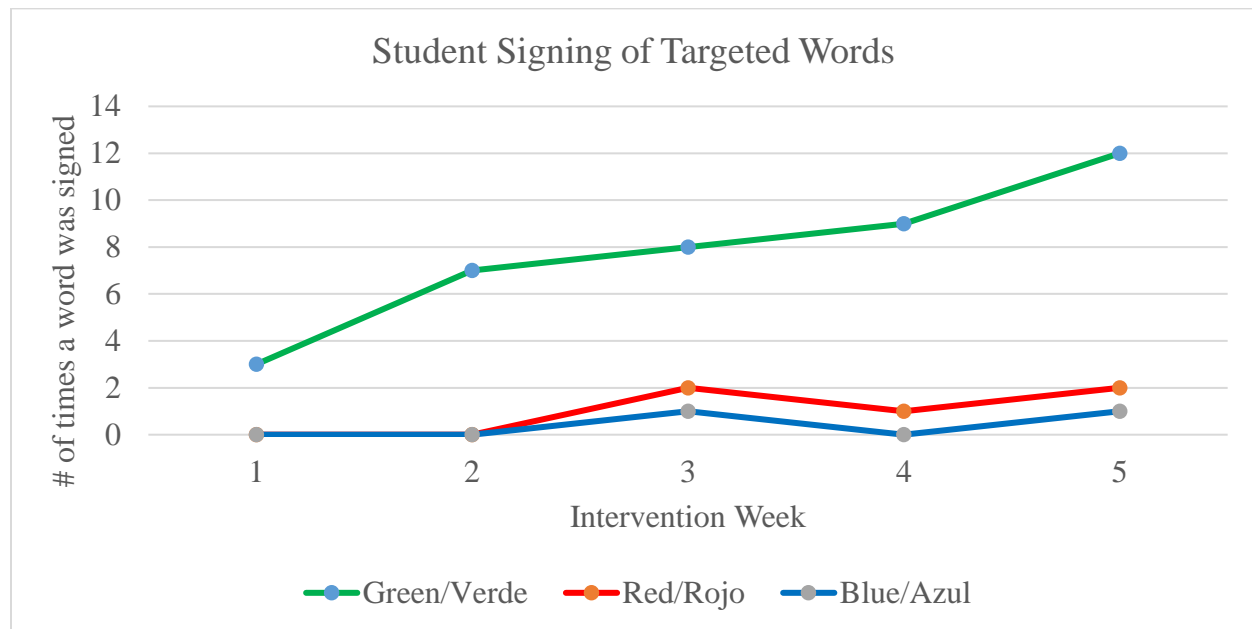


Figure 3. Times students in each intervention group signed their targeted word quantified. Each line represents a different intervention group comprised of students with similar Spanish fluency.

Figure 3 shows that the words assigned to the Green/Verde intervention group were signed at least three times as often as words on the other two word lists during the first two weeks of intervention. This trend increased to six times as often by the fifth and final intervention week. The four words that were signed most often were: Camina/Walk, Para/Stop, Agua/Water, Comer/Eat. The students in the Green/Verde group appear to be using the targeted sign language intervention more actively than the students in the other groups. There are many possible reasons why the students in the Green/Verde group were signing their targeted words more often than their peers. First, many of the words on the Green/Verde list are easy to sign.

Second, all the words are also commands that can be used daily by students of all levels in a Montessori environment.

A Montessori environment allows students to move independently in the classroom while the teacher or guide interacts with the children on an individual basis. The room is structured so that children take materials that are located on shelves to either rugs or tables. Due to the layout and organization of a Montessori environment, students have many opportunities to move and interact with one another. It is through this movement that students have the opportunity to learn. One component of the Montessori curriculum are the grace and courtesy lessons. Grace and courtesy lessons are initially introduced by the teacher or guide. Adults and older children model these lessons for their peers. For example, children model and practice how to walk in the classroom, how to push in their chair, and how to interrupt a conversation. Children will often use the word “stop” and “walk” when practicing these grace and courtesy lessons. These two words are part of the targeted word list for the Green/Verde group. Students in the Green/Verde group, therefore, likely had more practice with the words and signs on their targeted word list than their peers in the other two groups. Students in the Green/Verde group practiced each command word and sign with me during their small group interventions and then likely saw their older peers saying these commands and using these signs during their daily activities in the classroom.

Even though the returning students in the Red/Rojo and Blue/Azul groups had pre-existing knowledge of sign language, they did not sign their targeted words as often as their peers in the Green/Verde group that had no previous knowledge. The data in Figure 3 suggest that command words were signed more often than the more advanced words on the Red/Rojo

and Blue/Azul lists. The student's previous knowledge of sign language did not appear to encourage students to frequently sign their targeted words.

Figure 4 displays the number of times students said one of eight words on each of the word lists. The lines for each of the intervention groups show that all students said the words on their targeted lists more as they received more intervention. The students in the Green/Verde group again appear more actively involved with targeted Spanish instruction than their peers as the data in Figure 4 illustrate that they said their targeted words more often than their peers.

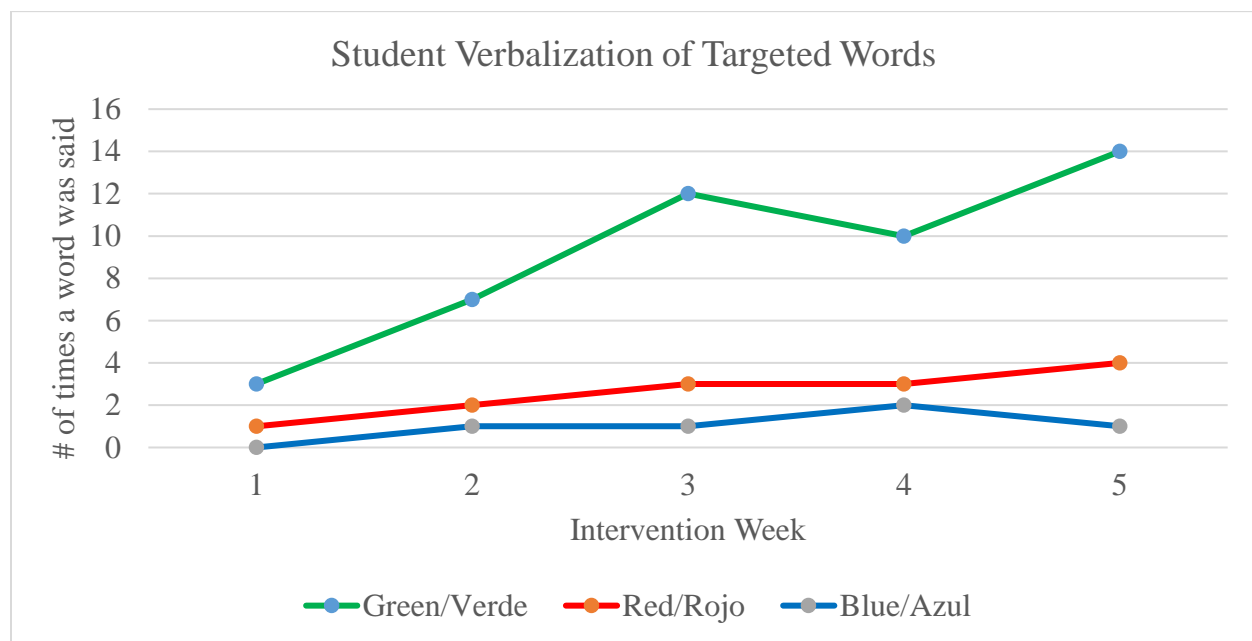


Figure 4. Times students in each intervention group verbally defined their targeted word quantified. Each line represents a different intervention group.

Figure 4 records twice as many targeted words as Figure 3, yet a comparison of the data shows that the number of times students said their targeted words did not double. This suggests that students were saying almost the same words they were signing. The type of words on each of the lists could have impacted the frequency with which students said or signed their targeted words, however, the data in Figure 4 do not provide conclusive evidence to this end.

Since many of my students were returning students, I used a daily observational log so that I could record compare how incoming and returning students were using sign language in the classroom. Figure 5 displays the number of times every week I observed students using sign language and includes observations of students signing words that were and were not on their word lists.

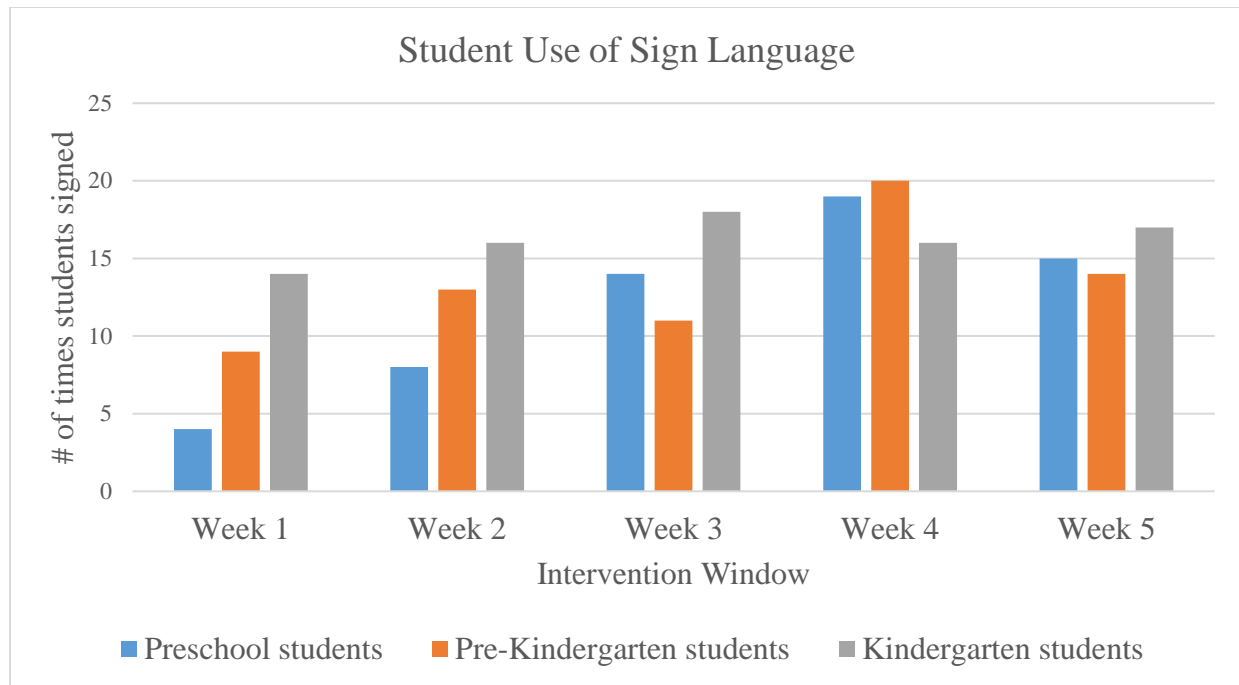


Figure 5. Student use of sign language quantified. Each bar represents the number of times students of each grade level used sign language in the classroom.

The data in Figure 5 illustrate that four-year-old pre-Kindergarten students and five-year-old Kindergarten students were actually signing more often than their three-year-old preschool peers. The notes in the daily observation log show that these returning students were actively signing the commands words that they learned last year. These commands are the same words on the Green/Verde word list. The data in Figure 5 and the data in the daily observation log suggest that the type of word does play a strong role in whether students will practice it in the classroom. All students, therefore, practiced command words more often than words from the IDEL test.

Results from the summative assessment (Figures 6-9) further discuss whether a student's preference for signing commands words impacted a student's ability to correctly memorize their targeted words.

Figures 6-8 first compare how students in each intervention group said the English translation and used the accompanying sign to define the targeted words that had accompanying signs on their lists. Figure 6 displays the total number of times that students in the Green/Verde group said or used sign language to define each word during the summative assessment. The data in Figure 6 supported the earlier claim that students tended to say and sign their words at the same time. The English translation and sign for Walk/Camina, and Eat/Comer were mostly remembered together. The signs for Stop/Para and Water/Agua were more memorable than the spoken words in Spanish.

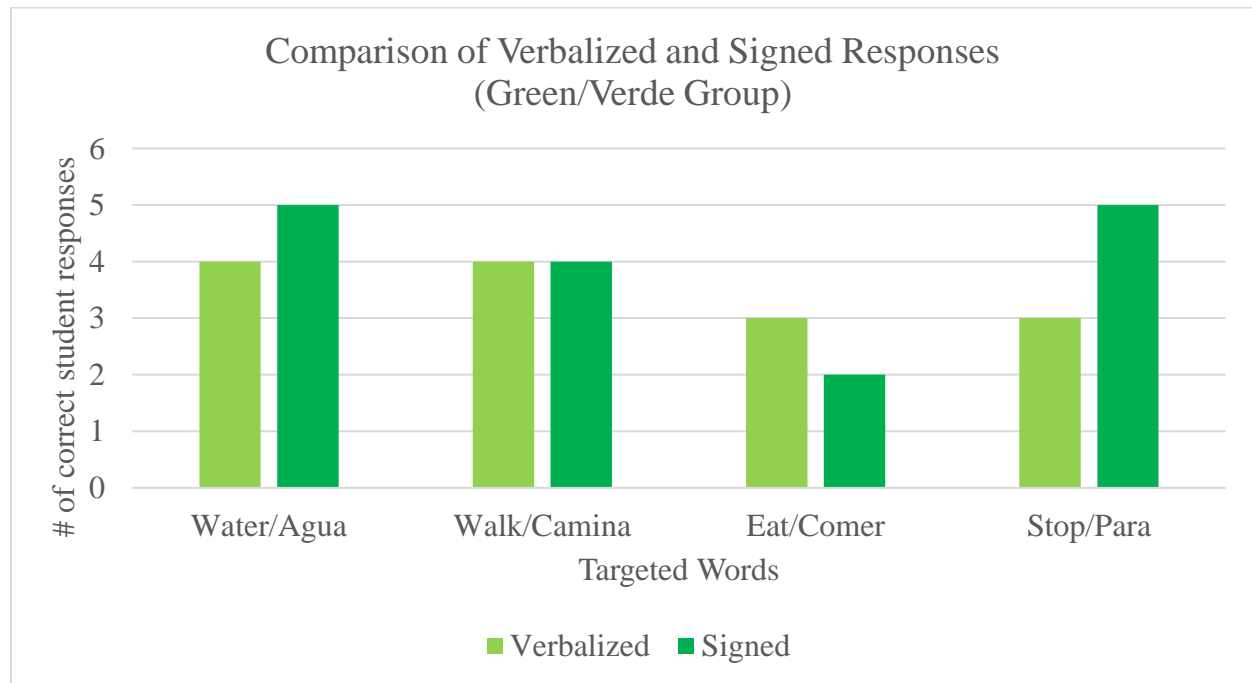


Figure 6. Comparing verbalized and signed student responses. Each bar represents the number of student responses using correct English translations and sign language on the summative assessment.

Figure 7 displays the total number of times that students in the Red/Rojo group said and used sign language to define the targeted words that were presented with signs during the summative assessment. The data in Figure 7 demonstrate that students in this group tended to say the English translation slightly more often than make the sign for each of their targeted words. The English translations for Grow/Crecer, Same/Igual, and Think/Pensar were, therefore, slightly more memorable than their signs for the students in this group.

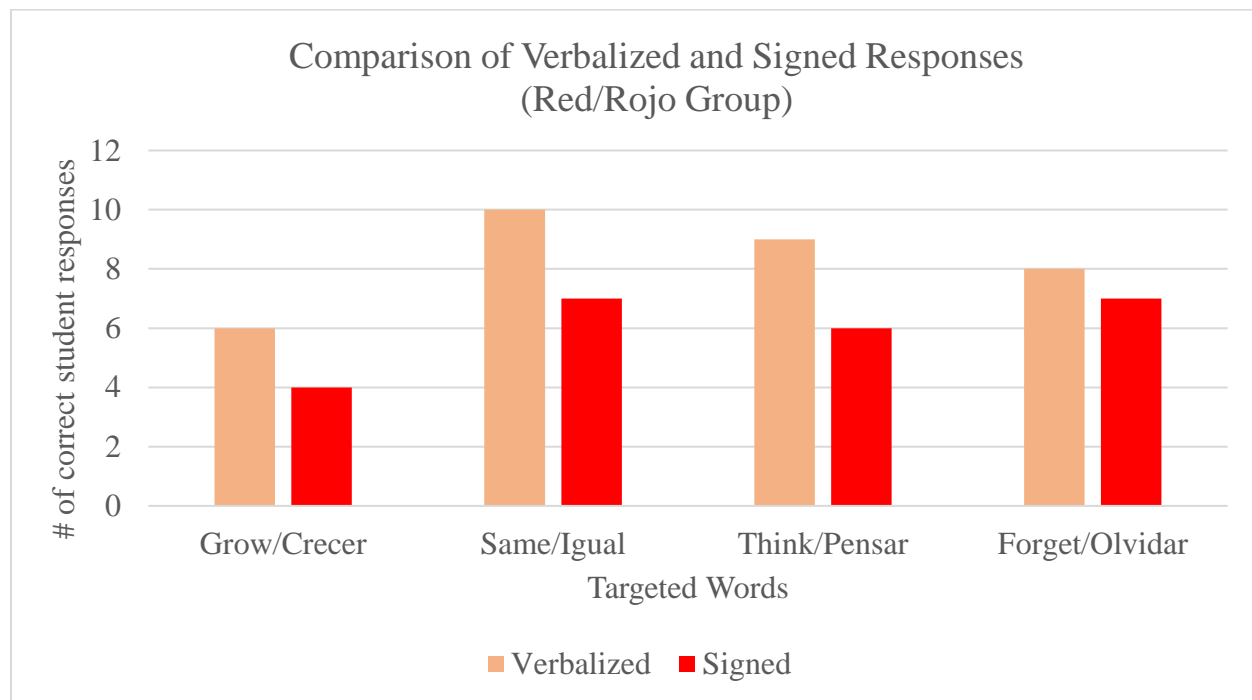


Figure 7. Comparison of verbalized and signed responses. Each bar represents the number of student responses using correct English translations and sign language on the summative assessment.

Figure 8 displays the total number of times that students in the Blue/Azul group said and used sign language to define their targeted words that were presented with signs during the summative assessment. The data in Figure 8 demonstrated that much like students in the Red/Rojo group, students in this group tended to say the English translation slightly more often than make the sign for each of their targeted words. The English translations for Deep/Hondo,

Neighbor/Vecino, and Edge/Orilla were, therefore, slightly more memorable than their signs.

Weight/Peso was the only word whose sign was more memorable than its English translation.

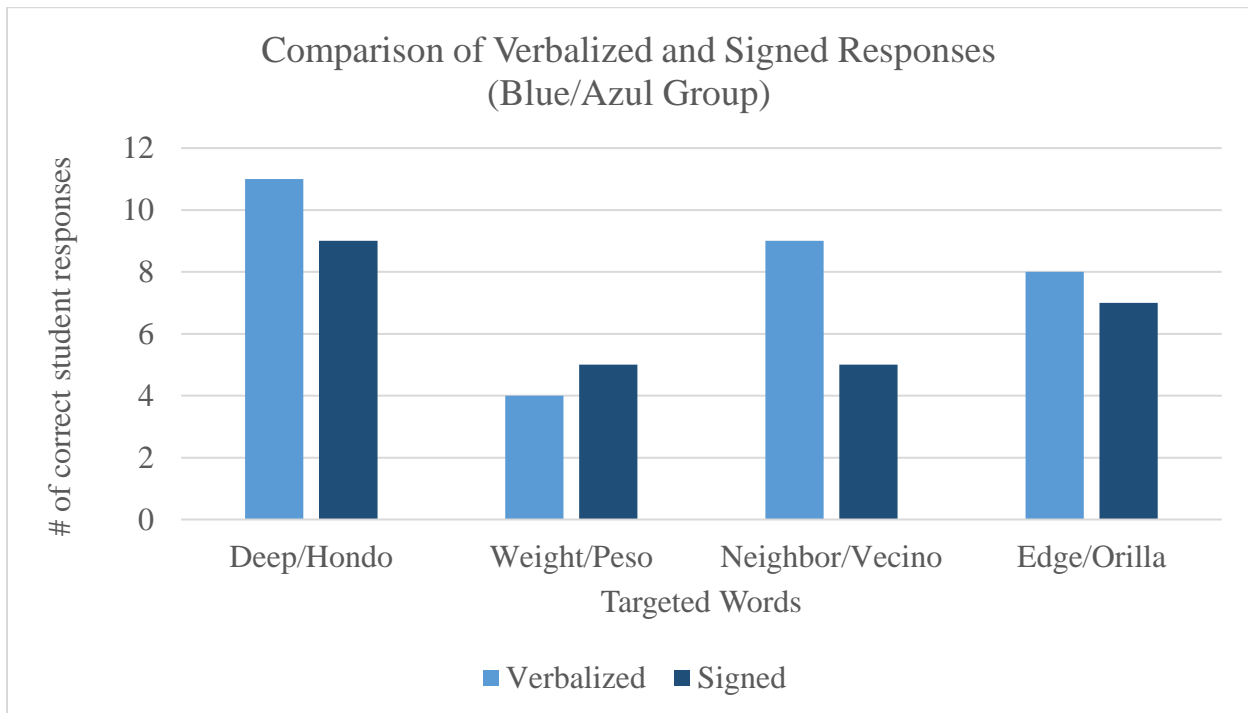


Figure 8. Comparison of verbalized and signed responses. Each bar represents the number of student responses using correct English translations and sign language on the summative assessment.

The data in Figures 6, 7, and 8 demonstrate that students of all ages used sign language as a way to define previously unknown Spanish vocabulary. A comparison of the data in Figure 6 with the data in Figures 7 and 8 highlights that students in the Green/Verde group used sign language more often than their peers as a way to remember their targeted words. Since most of the three-year-old students were in this group, this evidence suggested that younger primary students would likely use sign language more often than older primary students as a strategy for short-term second language acquisition.

The data in Figure 9 illustrate how successful sign language was as a strategy to help students memorize new vocabulary in the short-term. Figure 9 displays what percent of the targeted words on each lists the students were able to define on the summative assessment. The five students in the Green/Verde group were able to define targeted words with accompanying signs 80% of the time by either saying the English translation, making the corresponding sign in ASL, or both. The same students, however, were able to correctly define only 20% of the targeted words that were presented without accompanying signs. The nine students in the Red/Rojo group were able to correctly define their targeted words with accompanying signs in ASL 82.5% of the time by either saying the English translation, making the corresponding sign, or both. The same students, however, were able to correctly define only 35% of the words without accompanying sign. The 12 students in the Blue/Azul group were able to correctly define targeted words with accompanying signs in ASL 72.9% of the time by either saying the English translation, demonstrating the corresponding sign in ASL, or both. The same students, however, were able to correctly define only 35.4% of the words without accompanying signs.

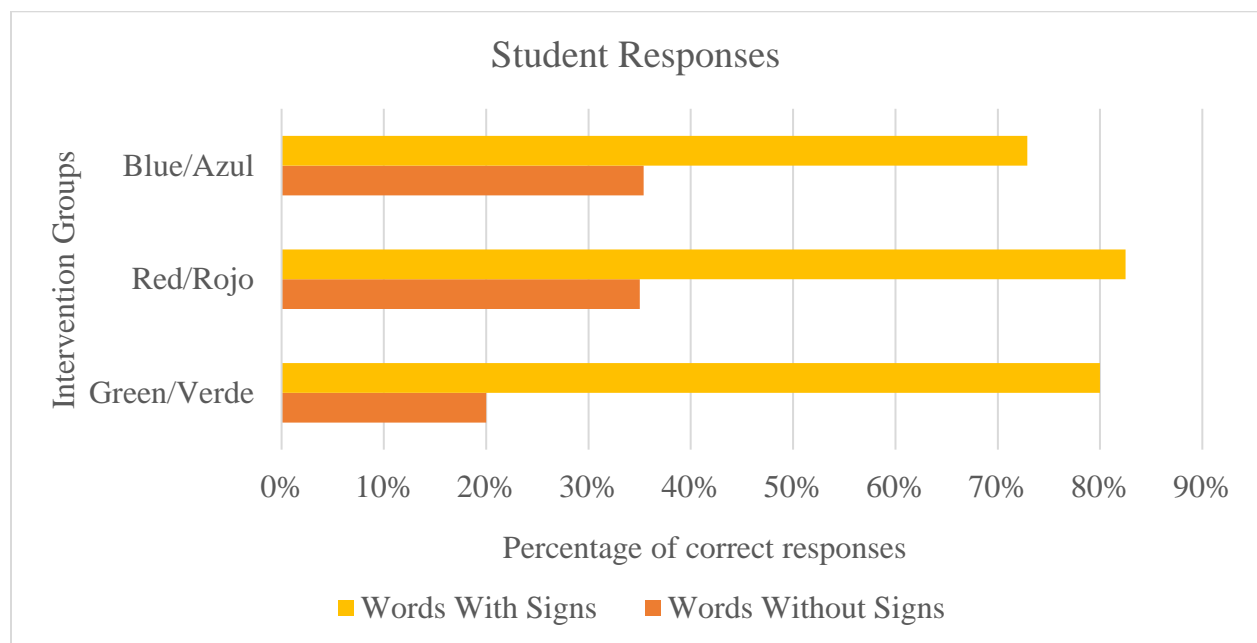


Figure 9. Accuracy of student responses quantified and compared among intervention groups.

Each bar represents the percentage of words that students in that intervention group were able to define correctly.

Figure 9 highlights the effectiveness of sign language in short-term second language acquisition as students in all three intervention groups correctly defined twice as many targeted words that were presenting with accompanying signs as words that were presented without a sign. The results of this study, therefore, provide strong evidence that sign language is an effective strategy in helping children learn new vocabulary words. The data also illustrate that the frequency with which students can see and hear their targeted words on a daily basis is not a strong factor impacting students' ability to recall new vocabulary in the short-term. The data suggest that young children would benefit most from using sign language and gesturing since the youngest students in this study, those in the Green/Verde group, slightly preferred signs to spoken translations of targeted words.

Action Plan

The sign language intervention had successful results. I taught Spanish vocabulary words with and without accompanying signs in ASL to observe the short-term effects of sign language as a strategy for young children to learn new words. The data showed that sign language was an effective strategy for students of all ages to learn all types of words. Command words, such as Stop and Walk, were common vocabulary words in a Montessori environment where students are actively learning classroom expectations. Students, however, were also able to correctly define words that were not as commonly seen or heard in a Montessori environment. Sign language was an effective strategy for helping students remember common and more complex Spanish vocabulary. Signs, then, can be successfully paired with Spanish words of differing levels of

complexity and taught to students of all ages. As a result of these findings, I will continue to use sign language in the classroom as a strategy to support children of all ages in learning new vocabulary words in Spanish. I will continue to use signs from ASL and pair them with words in Spanish.

I will also use the results of this study to begin to observe the effects of sign language and gesturing as a means to memorize new words in the long term. All the targeted words on the Red/Rojo and Blue/Azul word lists were from the IDEL assessment. My Kindergarten students will be tested in January on their ability to successfully use their targeted words in a sentence. Given the results of this action research, I expect that the Kindergarten students will do much better on this assessment than their peers last year. I plan to pair the words that were not presented with a sign during the study with a corresponding sign in ASL. I will then use the IDEL assessment to determine which students need to relearn these targeted words and use signing and gesturing as the main strategies for instruction.

As mentioned before, this study provides the basis for future research on the long-term effects of using signing and gesturing as strategies for second language acquisition. Hopefully, other educators can use what I have learned in my classroom to expand on the use of signing and gesturing as strategies for learning a second language. An analysis of the process and results of this action research project revealed that timing, duration, and pre-existing knowledge of sign language are factors that could have impacted the results of this project. Future researchers should take these factors into consideration before implementing a similar project.

The timing of the intervention window could have impacted my ability to assess the youngest children in the classroom adequately. If I had known the incoming students better, I could have assessed them more accurately. At the time of the post assessment, I had known my

incoming students for only seven weeks. I had known my returning students for at least 43 weeks longer, resulting in a more established relationship with these students. Also important to note is that all students at the beginning of the year need time to readapt to the classroom routine. Allowing time for students and teachers to get to know each other is important so that both parties are receptive to new intervention strategies.

I had to modify the duration of the intervention window mid-study due to interruptions to the classroom routine. The intervention lasted a total of 21 school days. The initial four-week window was lengthened to five weeks since the work cycle was frequently interrupted by an assortment of beginning of the year activities. Starting this study at a time of the year when there are fewer interruptions to the work cycle would allow the researcher to collect consistent data every day.

As discussed in the analysis of data section, 78% of students had a pre-existing knowledge of ASL, and 81% of the students has a pre-existing knowledge of Spanish in this classroom. It is possible that students were more receptive to sign language as a teaching strategy since the majority of students had seen their teacher sign before. It is also possible that returning students successfully learned new vocabulary since they were adding it to an already existing Spanish lexicon.

There are several changes that would improve the relevance of these findings. First, I would work with primary students in a multiage classroom that had no exposure to Spanish and no exposure to sign language or ASL. I would teach them all the same eight basic Spanish vocabulary words with and without signs in ASL beginning the last week of October. The multiage aspect would allow me to see the short-term effects of sign language on various ages. Since all the students would be learning the same words and signs, I could also examine the

effects of each age group's fine motor skills on a student's ability to replicate and practice signs. Eliminating previous exposure to Spanish and ASL would allow me to collect data without possible skewed results from having previous exposure to the target language and teaching strategy. Implementing the study later in the school year would better ensure that the students were familiar and comfortable with me and each other.

This study was able to provide strong evidence for the benefits of using sign language as a strategy for children to acquire vocabulary in a second language. The data was able to display the short-term effects of sign language as a strategy for young children to learn new Spanish words in a bilingual Montessori classroom. The summative assessment data showed that young children displayed a significant increase in their ability to recall new Spanish vocabulary words that were introduced with an accompanying sign in ASL. Future research on the intersection of sign language, gesturing, and second language acquisition could examine the role of signing and gesturing in helping students recall vocabulary in the long-term.

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Appendix A
New Student Orientation - Parent-Teacher Conference Questions

Child # _____		Date:	
Question	Answer	Comments	
What language(s) do you speak at home?			
What prior exposure does your child have to Spanish?			
What prior exposure does your child have to Baby Sign?			
What prior exposure does your child have to American Sign Language?			
Word List			
I am going to read a list of words in Spanish. After each word please tell me if your child has ever heard or said the word.			
Word	Translation	Heard / Not heard	Said / Not said
Hola	Hello		
Adiós	Goodbye		
Yo	Me		
Si	Yes		
Por favor	Please		
Gracias	Thank you		
Comer	Eat		
Camina	Walk		
Para	Stop		
Agua	Water		
Baño	Bathroom		
Mas	More		
Siéntate	Sit down		
Trabajar	Work		
Quiero	Want		
Ayúdame	Help me		
Guarda	Clean up		
Limpia	Clean		
Dibujar	Draw		
Termina	Finish		

Appendix B
Baseline Assessment

Pre/Post Assessment

Grade Level: Pre-Kindergarten

Word List			
Directions: I am going to read a list of words in Spanish. After each word please tell me what it means in English, show me the sign, or show me what it means.			
Word	Translation	Does he/she demonstrate a basic knowledge of the word? (Y/N)	Comments
1. Gracias	Thank you		
2. Comer	Eat		
3. Camina	Walk		
4. Para	Stop		
5. Agua	Water		
6. Baño	Bathroom		
7. Mas	More		
8. Siéntate	Sit down		
9. Trabajar	Work		
10. Quiero	Want		
11. Ayúdame	Help me		
12. Guarda	Clean up		
13. Limpia	Clean		
14. Dibujar	Draw		
15. Termina	Finish		
16. Crecer	Grow		
17. Igual	Same		
18. Pensar	Think		
19. Escribir	Write		
20. Necesito	Need		

Pre/Post Assessment**Grade Level: Kindergarten**

Word List			
Directions: I am going to read a list of words in Spanish. After each word please tell me what it means in English, show me the sign, or show me what it means.			
Word	Translation	Does he/she demonstrate a basic knowledge of the word? (Y/N)	Comments
1. Termina	Finish		
2. Crecer	Grow		
3. Igual	Same		
4. Pensar	Think		
5. Escribir	Write		
6. Oscuro	Dark		
7. Viento	Wind		
8. Vecino	Neighbor		
9. Piel	Skin		
10. Orilla	Edge		
11. Hondo	Deep		
12. Alrededor	Around		
13. Olvidar	Forget		
14. Tipo	Type		
15. Beber	Drink		
16. Pedazo	Piece		
17. Temprano	Early		
18. Rama	Branch		
19. Descanso	Break		
20. Peso	Weight		

Appendix C
Word Lists

	Red/Rojo Group	Green/Verde Group	Blue/Azul Group
Spanish words taught with ASL signs	<ol style="list-style-type: none"> 1. Water/Agua 2. Walk/Camina 3. Eat/Come 4. Stop/Para 	<ol style="list-style-type: none"> 1. Grow/Crecer 2. Same/Igual 3. Think/Pensar 4. Forget/Olvidar 	<ol style="list-style-type: none"> 1. Deep/Hondo 2. Weight/Peso 3. Neighbor/Vecino 4. Edge/Orilla
Spanish words taught without ASL signs	<ol style="list-style-type: none"> 5. Put away/ Guarda 6. More/Mas 7. Draw/Dibujar 8. Finish/Termina 	<ol style="list-style-type: none"> 5. During/Durante 6. Wind/Viento 7. Dark/Oscuro 8. Modern/Moderno 	<ol style="list-style-type: none"> 5. Dark/Oscuro 6. Modern/Moderno 7. Oil/Aceite 8. Will/Voluntad

Appendix D
Original Daily Checklist

Date: _____

Age Group	Used targeted Spanish word	Used sign for targeted Spanish word	Used sign and targeted Spanish word
Pre-School			
Pre-Kindergarten			
Kindergarten			

Appendix E
Modified Daily Checklist

Daily Checklist

Date: _____

Group	Targeted Word	Said targeted word	Signed targeted word	Said and Signed targeted word
Green/Verde	Agua			
	Camina			
	Comer			
	Para			
	<i>Guarda</i>			
	<i>Mas</i>			
	<i>Dibujar</i>			
	<i>Termina</i>			
Red/Rojo	Crecer			
	Igual			
	Pensar			
	Olvidar			
	<i>Durante</i>			
	<i>Moderno</i>			
	<i>Oscuro</i>			
	<i>Viento</i>			
Blue/Azul	Hondo			
	Peso			
	Vecino			
	Orilla			
	<i>Aceite</i>			
	<i>Oscuro</i>			
	<i>Voluntad</i>			
	<i>Moderno</i>			

Appendix F
Daily Observational Record Log

Date:	Weather:
<p><i>AR Research Question</i> What effects will American Sign Language have on the Spanish vocabulary of students in a bilingual primary Montessori classroom?</p> <p><i>Reflective Questions</i></p> <ul style="list-style-type: none">• Are any students using the targeted words and or ASL signs?• Would I consider this a normal work cycle?• Are there any students who are using ASL more/less than others?• Are there any students who are using the targeted Spanish words more/less than others?• Did I observe anything new that can be useful for my AR?	

Appendix G
Weekly Self-Assessment Journal

Date:	Week ___:
<i>AR Research Question</i> What effects will American Sign Language have on the Spanish vocabulary of students in a bilingual primary Montessori classroom?	
<i>Reflective Questions</i> <ul style="list-style-type: none">• Was I consistent in implementing the intervention this week?• Would I consider this a normal week?• Did I observe anything new that can be useful for my AR?• What informal feedback does my assistant provide?	