Western Kentucky University
TopSCHOLAR®

Honors College Capstone Experience/Thesis Projects

Honors College at WKU

Spring 2018

The Use of American Sign Language on the Sight Word Acquisition for Primary Elementary English Language Learners

Kaitlin Woodrow
Western Kentucky University, kaitlin.woodrow074@topper.wku.edu

Follow this and additional works at: https://digitalcommons.wku.edu/stu_hon_theses

 Part of the Curriculum and Instruction Commons, Educational Assessment, Evaluation, and Research Commons, and the Language and Literacy Education Commons

Recommended Citation
Woodrow, Kaitlin, "The Use of American Sign Language on the Sight Word Acquisition for Primary Elementary English Language Learners" (2018). *Honors College Capstone Experience/Thesis Projects.* Paper 759.
https://digitalcommons.wku.edu/stu_hon_theses/759

This Thesis is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Honors College Capstone Experience/ Thesis Projects by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.

THE USE OF AMERICAN SIGN LANGUAGE ON THE SIGHT WORD ACQUISITION FOR PRIMARY ELEMENTARY ENGLISH LANGUAGE LEARNERS

A Capstone Experience/Thesis Project

Presented in Partial Fulfillment of the Requirements for

the Degree Bachelor of Science with

Honors College Graduate Distinction at Western Kentucky University

By

Kaitlin A. Woodrow

Western Kentucky University

2018

CE/T Committee:

Dr. Susan Keesey, Advisor

Dr. Christina Noel

Dr. Julia Mittelberg

Approved by

Advisor
Department of Education

Copyright by

Kaitlin A. Woodrow

2018

ABSTRACT

While being a language with which to communicate, American Sign Language (ASL) has also been used in some elementary school settings to supplement curriculum for different students. There has been little research, however, on how sign language can be used to teach the specific population of English Language Learners. This is an important student group on which to focus because the number of EL students has consistently increased over the last ten years. With this in mind, teaching professionals need to find the most effective strategies to support their diverse students. Many primary EL students struggle particularly with sight words, which are high frequency words that oftentimes break traditional English rules. The purpose of this research project was to see if American Sign Language can be added to the instruction of sight words to increase student success with the words compared to the typical drill-and-practice. Results indicated that American Sign Language could be used to help students experience mastery of sight words and engage other students in the process of learning them.

Key Words: Capstone Experience, American Sign Language, Sight Words, Acquisition, English Learners

I dedicate this to the teachers committed to searching for ways to further student success.

ACKNOWLEDGEMENTS

The success of this project would not have been possible without the support of many people. Dr. Susan Keesey has been integral to this research as she offered her experience and knowledge to constantly guide the way. Along with her, Dr. Christina Noel provided essential information in modeling the single subject research design and always offered to answer questions. The project would not have been nearly as successful without their expertise. Other professors who deserve acknowledgement are those who taught me American Sign Language (ASL) over the years. This equipped me with the understanding of ASL that was utilized in this project, and I am indebted to them for the opportunity to learn their language and culture.

I would also like to thank Julie Grim for her instrumental role in implementing this project as she shared her time and advice every day. The students with whom I worked as well taught me the importance of a teacher being a researcher in order for children to reach academic success. While many individuals contributed to the success of this capstone research, Western Kentucky University graciously funded the project through a FUSE grant. I want to thank my family and friends as well for their encouragement during this challenging, yet rewarding, experience.

VITA

December 15, 1995 …… Born- Louisville, Kentucky

2014 …… Whitefield Academy, Louisville, Kentucky

2017 …… Presenter at Kentucky Conference for Exceptional Children, Louisville, Kentucky

2018 …… Session Winner for 48th WKU Student Research Conference, Bowling Green, Kentucky

2018 …… International Student Teaching in Linköping, Sweden

FIELDS OF STUDY

Major Field: Elementary Education (P-5) and Special Education: Learning and Behavioral Disorders (P-12)

Minor Field: American Sign Language Studies

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Over the years, the number of first generation students in public schools has been significant. According to the National Center for Education Statistics (2017), there are roughly 4.3 million English Learners (ELs) in public schools across the United States. For the 2014-15 school year, however, this was significantly higher as an estimated 4.6 million students were ELs (National Center for Education Statistics, 2017). That statistic grew from the previous 2013-14 school year by 100,000 students (National Center for Education Statistics, 2017). While the numbers have fluctuated slightly, the learning for this population in the classroom has been a growing concern. There have traditionally been barriers concerning learning, resulting in ELs lagging behind other students in the classroom. For example, the National Center for Education Statistics reported the graduation rate of ELs is 63%, with the national average being 82%, while only 66% of ELs graduate in the state of Kentucky (as cited in Sanchez, 2017).

With the growing number of ELs in the classroom and low rate of graduation within the population, it is essential that teachers are equipped with the necessary tools for instruction in order to cultivate academic success. In the educational field, strategies

in the classroom that benefit students with disabilities have also been used for students who are learning English as a second language, such as providing images and breaking down learning into small steps (Learning Disabilities Association of America, 2013; Robertson & Ford, 2016). American Sign Language (ASL), the precious language of deaf individuals across the United States for over two hundred years, has quickly become a method of communication for the population of students with disabilities. Given that ASL is a strategy to spur students with disabilities on towards academic success, it elicits the question whether or not it would be just as valuable for students in an English as a Second Language (ESL) program. To explore this question, this paper analyzes research conducted about brain developmental changes for language acquisition, the learning styles of children, and past studies of incorporating sign language into a school's curriculum to promote the learning of the English language. The purpose of this is to provide foundational knowledge for the basis of the research project of investigating if ASL can be used as a bridge from a native language to English.

The brain is a complex organ that controls the functions of the body and holds acquired knowledge. Concerning its knowledge of human language, Guasti (as cited in Sakai, 2010) explained that "the native or first language (L1) is acquired during the first years of life through such primary faculties while children are rapidly expanding their linguistic knowledge." Through interactions with people more versed in the language and simply being immersed in it, children learn the conventions of it as it becomes their native language. The left inferior frontal gyrus (IFG) of children's brains function as a control center for comprehension and language production. When promoting the

acquisition of a second language, however, there are two considerations to be made when looking at how the IFG is affected and will influence learning: the age of acquisition (AOA) and the proficiency level of the second language (L2, Sakai, 2010).

According to Wartenburger et al. (2003), cortical activations are affected by AOA as the left IFG activation for grammatical processing in L2 is greater than L1 while the exposure to the language also affects the left IFG activation. If a child is immersed earlier in the L2, he has a greater opportunity to have faster acquisition of it. More often than not, students who try to learn English as a second language struggle with it because they are not fully exposed to it since they can be past the prime AOA and possibly do not have many opportunities to practice English.

Sign language, however, differs from spoken languages as it utilizes another area of the brain. According to a recent fMRI study from Homae et al., the results showed ASL recruited bilateral cortical areas in the brain for processing in both deaf and hearing native signers, which differs from left-lateralized processing for simple written English (as cited in Sakai, 2010). Because sign language activates another area of the brain and not just where the L2 typically stimulates, this could benefit EL students who seem to have passed AOA for a spoken language if they use ASL. This could then in turn assist them in trying to master the English language that would normally be more difficult due to being older than the normal AOA.

The fact that sign language utilizes more than the left-lateralized side of the brain is not the only reason it can be helpful for EL students as they attempt to learn English in school. According to Mckeown (2003), most primary-aged students are kinesthetic-

tactile learners, which includes learning best through being physically involved in an activity or acting out a situation. Given that sign language requires the signer to incorporate fine and gross locomotor movements while communicating, it is a kinesthetic activity in which young students can be involved and will enjoy. Gestures have already been used in general education classrooms because students in K-3 were discovered by researchers to experience success with hand gestures for comprehension processes ("Rope them in," 2010). Involving the students in the learning through movements and using their hands improved reading comprehension with the addition of kinesthetic learning.

Finding instructional strategies that maximizes student learning is a goal of many teachers, and some have done this by utilizing sign language in their classrooms to supplement the curriculum. Cooper (2002) explained that signing gives an additional visual tool for struggling readers, enriches advanced readers' learning, and helps all students with words by providing various cues. In her classroom, Cooper taught her students to sign and fingerspell letters to improve their spelling of English words. After being presented with a word, Cooper asked her students to fingerspell it to "learn not only by sight but by feel that there is a special order of letters left to right." Once she set up how the students think of the letters phonetically and how they look visually with ASL, Cooper shifted the focus to using activities to build on what the students knew. Activities for the classroom included fingerspelling words from the same word families, signing short sentences with the students, and playing games utilizing the different signs.

Wurm (1986), a teacher from Ohio, also used ASL in her classroom to teach sight

words in Kindergarten. Sight words are high-frequency words that tend to reappear on any page of a given text (Blank, 2011). Wurm presented pictures of the word and instructed the students to verbally and manually, with ASL, repeat the word. Once the scaffolding of the pictures was removed, the written word was displayed to the students. They were asked to repeat it like before until they could pronounce the words independently unless some students were lost and needed prompting with the word's ASL sign. Results were observed in and outside of the classroom. Along with noticing the students learning the words faster, Wurm noticed that students in the general education classroom started using the ASL they had learned to communicate with their peers with disabilities who may not be able to speak as eloquently as them. In that situation, there was a two-pronged benefit for the classroom as the students could learn the curriculum material and be able to communicate with one another.

In addition to primary students in the general education classroom, ASL has been utilized in the instruction of EL students. By pairing music and the visual-gestural language of ASL, teachers targeted vocabulary and used pre- and post-tests to compare among four groups with the conditions of *sung text paired with signs, spoken text paired with signs, sung text,* and *spoken text only* (Schunk, 1999). The data show improvement for all the groups but revealed that the groups with signing displayed the most growth and suggested that integrating signs for second language rehearsal can provide students with visual cues while also engaging them in physical participation.

These studies suggest that incorporating a visual representation of English through ASL can be successful because a different area of the brain is activated for that

language along with the fact that younger students learn better with kinesthetic activities in the classroom. Similar to these previous studies, the goal of this research is to measure the effectiveness of American Sign Language as a tool in the classroom. While there is a connection involving the sign language, this project differs because it targets the specific population of English Language Learners and their success with sight words.

Sight words were chosen for this study because children build on their phonemic awareness skills to start reading independently around Kindergarten to second grade. For students who are in ESL programs in school at this time, they often struggle with the structure of English words and retaining them. This often leads to them trying to sound out sight words that are meant to immediately be recognized while reading. By conducting this research, I hypothesize that ASL will assist ELs in acquiring the understanding of English sight words they will continue to see on a daily basis. This will be done with regards to brain development as well. The research conducted for this project will continue to build on the previous explorations of those who have used the language to assist students in the classroom and propel them towards academic success. To accomplish this, the following research questions will be addressed:

- Can American Sign Language (ASL) be an effective strategy to promote learning sight words for English Learners (ELs) in primary elementary grades?
- With American Sign Language, can ELs learn sight words at a faster rate than the standard practice of repetition and exposure?
- Which would ELs enjoy learning with more—sign language or just flashcards?

CHAPTER 2

METHODS FOR RESEARCH

Four students in first grade were chosen as subjects. The selection criteria for being picked consisted of students being in a primary grade level, receiving English as a Second Language (ESL) services, and having parental consent. Individual assent was obtained as well to ensure that the students wanted to participate. Gender was not a deciding factor in being selected, and this project included one girl and three boys. Each student had the opportunity to choose his or her name, and they are: Elsa, Roy, Spiderman, and Jerry. Elsa is a typically-developing six year old female; Roy and Spiderman are six year old typically-developing males. Jerry is also a six year old male student in this project who receives special education services while at school for developmental delay (DD).

Each of these students was instructed one-on-one two to three times a week for the duration of this single subject design research. When they completed each session, both candy and stickers were utilized as rewards. Before starting, however, a baseline was determined for each student. Lists of Dolch pre-primer and primer words that could have ASL sign equivalents were selected. I presented a deck to each student to determine which words he or she did or did not know. This eliminated words the students already knew from being included in their individual decks for the interventions.

The words that were not identified for three consecutive sessions were put in a randomizer application in order to create a deck of ten words for each student (see Appendix A). Within each deck, five words were randomly selected as Flashcard Sight Words (FSW), and five were Sign Language Sight Words (SLSW).

Each session was conducted two to three times a week and lasted five to ten minutes with each student. The sessions were conducted in an open classroom setting. A computer randomizer decided which days would have FSW or SLSW and each method could not be repeated more than two consecutive times. For example, the FSW intervention method could be implemented with one of the students for two days, but the session after those had to be the SLSW intervention method. This was to help with maintaining equal levels of exposure for each intervention method. The students therefore had different intervention days as well. This means that Elsa could have a FSW session, SLSW session, and another FSW session while Spiderman had two SLSW sessions followed by a FSW session during one week.

Procedure

For every session, I would follow a script with the same protocol to ensure procedural integrity. At the start of each session, the student was asked to identify all ten of his or her words to see if he or she remembered any of the words from previous sessions. If a student remembered all five words for either FSW or SLSW intervention methods for two consecutive days, he or she reached mastery. Responses were therefore recorded in order to see how many of the words the students retained from previous sessions. This was to track progress on the words for the respective methods. After the

initial data were collected, intervention began with either the FSW or SLSW method.

FSW Method. For the FSW method of instruction, it incorporated standard notecards with the respective words written on them. Students were exposed to each word three times during one session following the "I do it, we do it, you do it" method of instruction. This instructional strategy involved modeling a step first ("I do it"), performing that step with students to provide guided support and practice ("We do it"), and then allowing students the opportunity to try the step independently ("You do it"). After data were collected to see how many of the ten words the student could recall, I presented each word on the flashcard. I said, "This is the word _____" and would spell the word before repeating it again out loud. This modeled the correct pronunciation of the word and explicitly showed students what letters comprised the word which connects to the "I do it" part of the session. After this, I asked the student to verbally identify the word with me while looking at the card. This was the "We do it" portion since the students tried saying it with me for the first time and I could hear if they said the word correctly or erred. I then told the student to say the word alone, which was the "You do it" part of the session to see if the student could accurately verbalize the word.

If the FSW word was correctly identified, I would move on to the next word in the shuffled deck of FSW cards and follow the same procedure. If the student incorrectly identified the word, I asked him or her to repeat the word again with me. I would then request the student to say it one more time independently. If it was correct, I moved to the next word; if it was incorrect again, I would say it correctly and then move on to the following word. After the FSW deck of five words was completed three times during one

session, the student received a piece of candy or sticker and a high five before returning to class.

SLSW Method. Regarding the protocol for the SLSW intervention method, the students were shown each of the five cards a total of three times during one session, similar to that of the FSW method. For SLSW, however, an ASL sign accompanied the word being spoken aloud. I followed the same script as the FSW intervention with the "I do it, we do it, you do it" procedure but added in signing the word when it was said aloud. During the "I do it" part, I would say the word, spell it, and then sign it while saying it aloud again. I then practiced saying and signing it with the student for the "We do it" part before asking the student to try it on his or her own. If the student signed and said the word correctly the first time during the "You do it" part, the next word was shown. Incorrectly identifying the words, however, involved the guided and independent parts of the script being repeated again with the student. If he or she incorrectly signed and said the word for a second time, I said and signed the word correctly before moving on. Like the FSW intervention days, the student would receive a piece of candy or sticker and a high five at the end of each session.

As mentioned previously, to reach mastery, students had to either correctly identify the five sight words for FSW words or say and sign the five SLSW words at the beginning of a session for two consecutive days. Whenever a student reached mastery on all five cards for either SLSW or FSW, his or her preferred method of learning was established. This meant that the student learned the best with that certain method because the words were acquired at a faster rate. Once this occurred, the rest of the student's

cards that were not yet mastered were switched to the preferred method. For example, if a student mastered all SLSW words first, the rest of the FSW words that had not been mastered for two sessions or more were then changed to have signs added since the student's preferred method was verbalizing and signing the words after seeing them.

Once the students reached mastery for all ten words, a social validity questionnaire was shared with them in order to see which method they personally enjoyed more, the words without ASL signs or the ones with the signs.

CHAPTER 3

RESULTS OF INTERVENTIONS

After conducting interventions over a span of six weeks, data were collected for each student and consolidated into graphs. In the respective figures, the attempted masteries for both the FSW and SLSW words, phases of interventions, and preferred methods of instruction are displayed. The FSW line corresponds to the number of words the students accurately identified after practicing with only flashcards. For the SLSW line, this shows how many words the students knew once they had instruction of flashcards and ASL signs. Two students, Elsa and Roy, completed their decks of cards. Roy and Spiderman were the two students with preferred methods of learning based on mastery of the respective decks, and Elsa's preferred method of learning was indicated through the social validity questionnaire. All three of the previously mentioned students had SLSW as their respective preferred methods of instruction, which involves the incorporation of American Sign Language. The other student, Jerry, did not complete his words when interventions ceased at the end of the semester.

Individual Student Results

Elsa. When looking at the end of her sessions (see Appendix D), Elsa's results show that she reached mastery on all ten words at session 13. Another intervention

session was conducted after session 12 as needed to meet the mastery criterion. When Elsa accurately identified all ten words again, a preferred method of learning could not be determined given that all ten words were mastered concurrently so a social validity questionnaire was then administered because it requested the student's personal opinion on whether learning words with "motions" was more enjoyable than words without them. Elsa responded that she liked learning with the motions more, thus defining her personal preferred method of learning as SLSW.

Roy. Roy was the other student who completed his deck of cards. On session nine (see Appendix E), Roy scored all SLSW words correct for the first time and then did that once more the next session. As shown by his graph, he consistently stayed at four FSW words correct for five sessions before his preferred method of learning was deemed as SLSW. Once that last FSW word was switched to include an ASL sign, three more sessions took place until mastery for all five words was reached over a span of two consecutive days.

Spiderman. The last student who had a preferred method of learning established during the intervention was Spiderman. On session eleven (see Appendix F), he reached mastery by correctly identifying all five SLSW words for the second consecutive session. With his preferred method of learning then being SLSW, his remaining four words were switched to having ASL signs. After one session with the ASL signs, Spiderman's word count jumped to three words correct from previously being one, and he steadily made his way up to scoring all words correct once in a SLSW session with the previously taught FSW deck. Due to the clinical experience ending at his elementary school, the

intervention sessions had to come to a stop. When presented with a social validity questionnaire, Spiderman expressed that he personally enjoyed learning with the motions, which was the SLSW method of instruction.

Jerry. Due to time constraints, Jerry did not complete the intervention and therefore did not demonstrate a preferred method of learning determined by session data. His graph (see Appendix G) displayed more variability and more sessions required to master the sight words. The highest number of words correct was four FSW words and four SLSW words on session 15.

Social Validity, Procedural Fidelity, and Interobserver Agreement

Once the intervention ceased for the students, the social validity questionnaire was conducted with each student (see Appendices B and C). All four students said they enjoyed the intervention, both FSW and SLSW. At the end of the questionnaire, the students were asked one more question: "Which was more enjoyable—the flashcards or the sign language motions?" For an answer, all four of the students verbalized that they personally liked the sign language more.

Procedural fidelity and the interobserver agreement also were both key in the progression of the intervention. In order to keep procedural fidelity, each session utilized the same script, checklist, and data sheets for the students. Data were collected for the sessions to calculate to what extent the procedural fidelity was upheld. The interobserver agreement also ensured that accurate results were recorded for the students, and this occurred over a span of 15 sessions. Over the course of all the sessions, a second researcher was present 67% of the time. Interobserver agreement and procedural fidelity

were calculated over these sessions and was 100% for interobserver agreement; the second researcher and I were also in agreement 100% of the time regarding the data collected.

CHAPTER 4

DISCUSSION

With the project being a single subject alternating treatment design, each student displayed varying degrees of growth. With Elsa displaying mastery of all ten words on the same days, this implies that she is the type of student who can learn in multiple environments. When establishing a baseline, Elsa mastered the majority of the words for the Dolch pre-primer list. Because of this, her baseline was conducted with primer words from the Dolch list. Because she was already slightly ahead for sight words compared to other EL students in the project, this provides insight into the reason why she progressed faster than the other students and at the same rate concerning the word decks. Having the sign language added into the instruction did not detract from her success; it simply provided another method of engagement for her.

Concerning Spiderman and Roy, they exemplify how students might benefit from the addition of sign language into instruction. Based on this being successful for these two students, it opens the door for the possibilities of incorporating sign language into other areas. This can include areas like vocabulary, which is another area in which ELs have been observed to struggle. The subject of ELs with vocabulary and sign

language can be a topic for further research for this particular project to see if it can create more student success. Building on this specific project, research can be conducted with more students in small guided group settings or as a type of independent station within the classroom.

Jerry also provided a unique look at this project because of his disability. By looking at his data, one sees the commonalities for students with disabilities. Similar to Jerry's graph, learning often goes up and down concerning mastery. Based on his results, Jerry would possibly benefit from more of a consistent schedule, one that includes daily instruction instead of simply twice a week. With this additional support, Jerry may experience more success in terms of retaining the words. The research from Sakai (2005) can provide insight into thinking about the consistency and implementation for future practice. For example, if Jerry is presented with the words and sign language on a more consistent basis, the constant activation of the bilateral cortical areas of the brain through the repetition of the sign language can potentially yield more success for him. This would be an area to explore further for students, especially those with disabilities. More research for EL students with developmental disabilities can benefit future knowledge of the specific population, and Jerry showed how important it is that educators consider the student group.

Even though the four students demonstrated varying results, they reflect how individual students learn at differing paces. This is crucial to consider when expanding research on the topic as a single subject design would be best to continue in order to have each student as his or her own comparison regarding how the learning takes place. When

pursuing this topic further, an aspect to explore would be to see if having an increased number of sessions would help the students learn at a faster rate.

When thinking about the entirety of this project, all of the research questions were answered. Regarding whether or not ASL can be used as an effective strategy for ELs, the answer is yes. Sign language can be used to provide an additional cue to students while they learn. It could either support students to learn specific material with which they struggle, such as Roy learning that last FSW word by incorporating a sign, or simply providing them with another visual. More research can be conducted to see if it helps ELs more than native English speakers, but sign language can overall be a method to utilize with ELs for sight words in the classroom. This was the hope for this particular project, and so it can be considered successful since the students could take some knowledge away from the intervention.

For the research question regarding if sign language helps students learn the sight words faster than just standard repetition, that answer lies with each student. This project demonstrated how each student learned the words at different paces. With this in mind, the sign language could assist some students learn sight words faster because of the additional cue while not being as immediately helpful for other students. In order to get more of a general consensus for that question more research needs to be conducted with a larger number of individual students. The students also all answered the question of sign language versus only flashcards with a unanimous response of preferring sign language. This shows that since the students personally enjoyed the sign language, it can be useful for future experiences with them and other potential students.

REFERENCES

Blank, M. (2011). Top 100 sight words and how to teach them. Retrieved May 1, 2017, from https://www.readingkingdom.com/blog/2011/04/20/how-to-teach-kids-sight-words/

Cooper, B. (2002). The use of sign language to teach reading to kindergartners. *The Reading Teacher, 56*(2), 116–119. Retrieved January 2, 2017.

Learning Disabilities Association of America. (2013). *Successful strategies for teaching students with learning disabilities.* Retrieved April 04, 2018, from https://ldaamerica.org/successful-strategies-for-teaching-students-with-learning-disabilities/

Mckeown, R. (2003). Working with K–12 schools: Insights for scientists. *BioScience, 53*(9), 870. Retrieved January 2, 2017.

Robertson, K., & Ford, K. (2016) "Language Acquisition: An Overview." *Colorin Colorado*. http://www.colorincolorado.org/article/language-acquisition-overview#h-instructional-strategies

Rope them in with hand gestures. (2010). *The Reading Teacher, 64*(4), 282–284. Retrieved February 1, 2017.

Sakai, K. L. (2005). Language acquisition and brain development. *Science, 310*(5749), 815–819. Retrieved January 2, 2017.

Sanchez, C. (2017). *English language learners: How your state is doing*. Retrieved March 26, 2018, from https://www.npr.org/sections/ed/2017/02/23/512451228/5-million-english-language-learners-a-vast-pool-of-talent-at-risk

Schunk, H. A. (1999). The effect of singing paired with signing on receptive vocabulary skills of elementary ESL students. *Journal of Music Therapy, 36*(2), 110–124. Retrieved January 2, 2017.

U.S. Department of Education, National Center for Education Statistics. (2017). *The NCES fast facts tool provides quick answers to many education questions.* Retrieved March 26, 2018, from https://nces.ed.gov/fastfacts/display.asp?id=96

Wartenburger, I., Heekeren, H. R., Abutalebi, J., Cappa, S. F., Villringer, A., & Perani, D. (2003). Early setting of grammatical processing in the bilingual brain. *Neuron, 37*, 159–170.

Wurm, T. (1986). Teaching sight words with sign language. *The Reading Teacher, 39*(7), 744–745. Retrieved February 1, 2017.

APPENDIX A

Selected Words for Students

	Elsa	**Spiderman**	**Roy**	**Jerry**
SLSW Words	fly	blue	what	look
	how	help	our	can
	think	see	out	not
	again	two	good	big
	after	little	soon	make
FSW Words	once	play	under	and
	give	red	with	up
	every	come	must	find
	take	where	please	we
	old	here	ride	for

APPENDIX B

Student Social Validity Questionnaire

This questionnaire will be read to the participants by the Co-PI and she will mark their answers.

1. I liked meeting with Ms. Woodrow to learn sight words.

   ___yes ___no ___kind of

2. I liked when we did the flashcards together.

   ___yes ___no ___kind of

3. I liked when we did the sign language together.

   ___yes ___no ___kind of

4. Which one did you like better?

   ___sign language ___flashcards

5. I learned a lot meeting with Ms. Woodrow.

   ___yes ___no ___kind of

APPENDIX C

Social Validity Questionnaire Responses

Question	Number of Students with a Response of "Yes"	Number of Students with a Response of "No"
"Did you like meeting with me for the sessions?	4	0
"Did you like learning with the flashcards?"	4	0
"Did you like learning with the motions?"	4	0
"Do you feel like you learned a lot by meeting with me?"	4	0

APPENDIX D

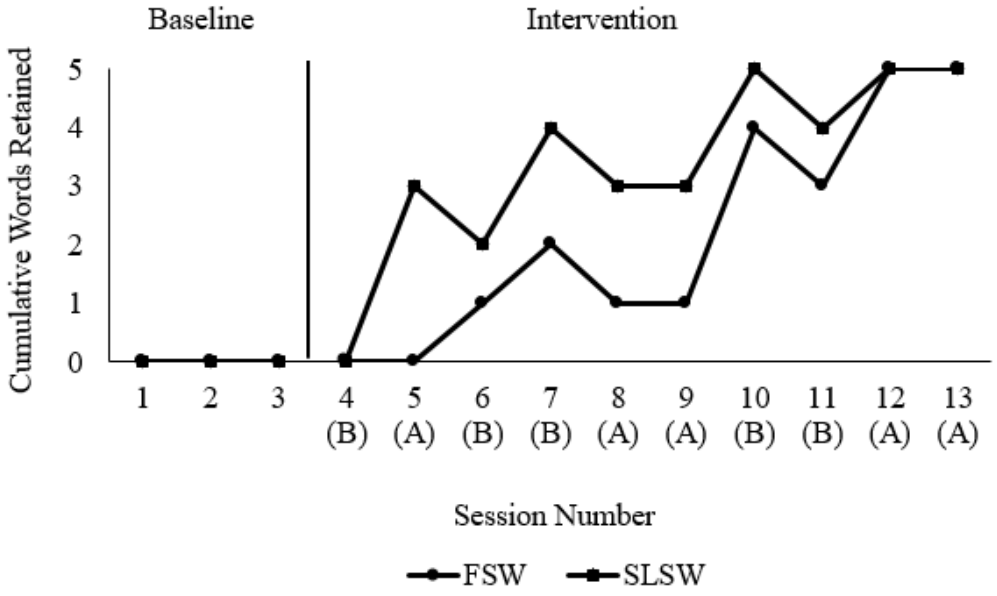

Figure 1. Total words for SLSW and FSW for Elsa

APPENDIX E

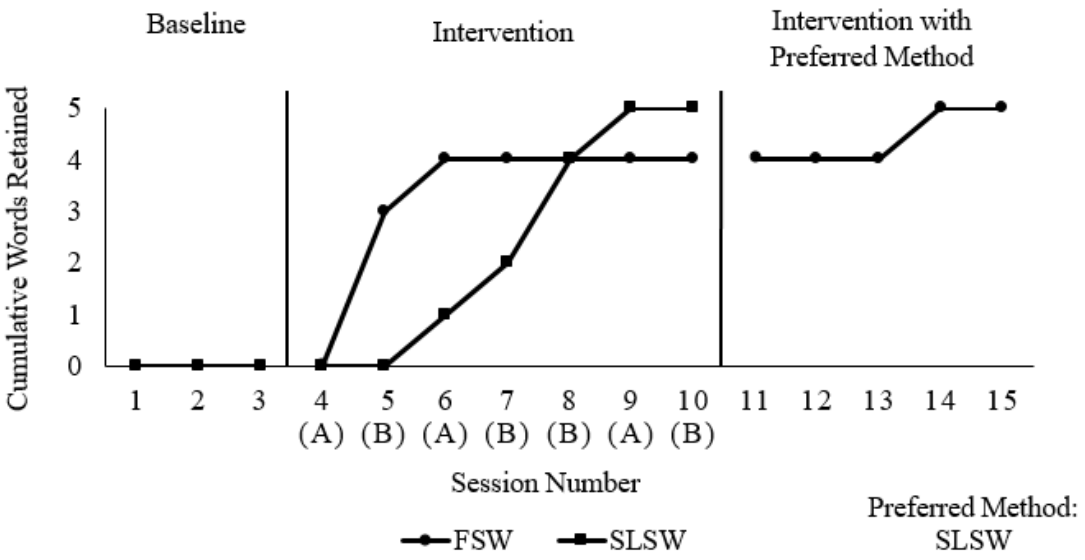

Figure 2. Total words for SLSW and FSW for Roy

APPENDIX F

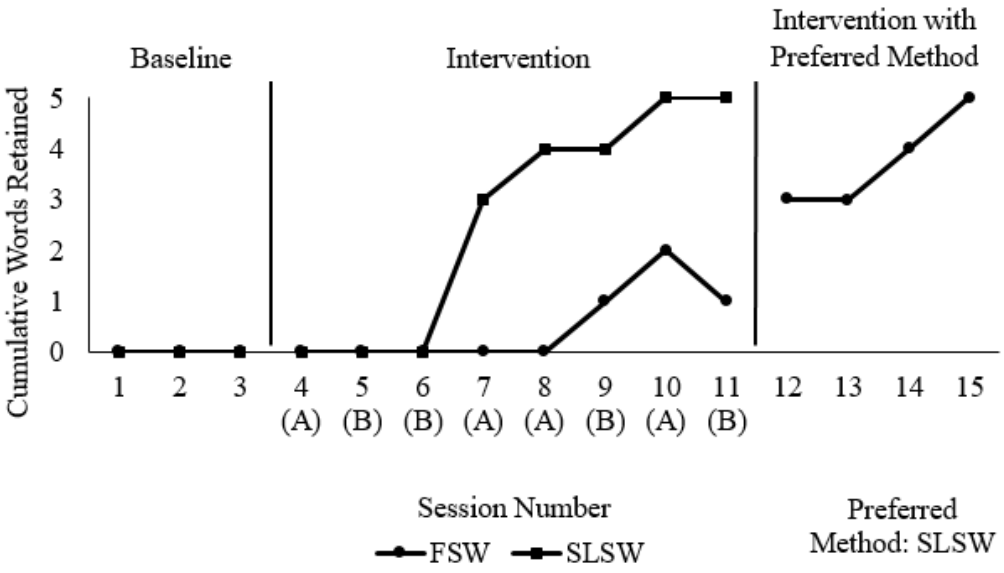

Figure 3. Total words for SLSW and FSW for Spiderman

APPENDIX G

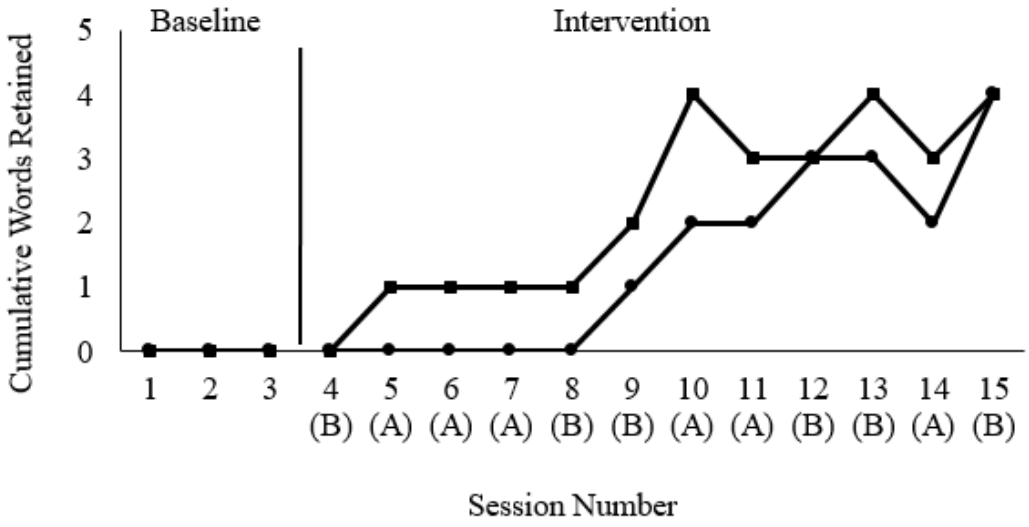

Figure 4. Total words for SLSW and FSW for Jerry