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# ASL Versus Gestures: Mothers Promotion of Manual Communication with Their Children

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ASL VERSUS GESTURES: MOTHERS PROMOTION OF MANUAL COMMUNICATION  
WITH THEIR CHILDREN

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WITH THEIR CHILDREN

by

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THESIS

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## **ABSTRACT**

Using ASL and/or gestures has been found to facilitate verbal language in hearing children and has become a new area of interest among researchers. Because socioeconomic status plays a role in behaviors and language development, this study was designed to target individuals from low socioeconomic backgrounds in the hopes of finding whether ASL or gestures were used more by their children, whether mothers are capable of promoting the use of ASL in the home environment, and whether ASL or gestures was preferred more by the mothers. Mothers were taught ASL signs based on the MacArthur Communicative Index and gestures in the form of fingerplays to interact with and teach their children. Measurements included counts of ASL signs and gestures produced by the children, self reported ratings of using ASL at home, and ratings of each condition by the mothers. It was found that most child participants produced a greater amount of ASL signs during the training session than gestures and mothers were capable of extending the training session into the home environment; however certain aspects of using ASL decreased as time post training increased. The mothers rated the ASL training session slightly higher than the gesture training session. This suggests that using ASL with children from low socioeconomic status may be an option to facilitate verbal language and potentially prevent language delays or disorders.

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## INTRODUCTION

### **Mother-Infant Interactions and Low Socioeconomic Status**

Mother-infant interactions are essential to the language learning process of an infant. From birth, an infant is in constant communication with his mother as she behaves in a manner that is stimulating to her infant and continuously pushes the limitation of stimulation (Owens, 2008). Mothers use skills such as face-to-face communication, touch, gaze, body movements, baby talk, and other types of appropriate interaction skills to communicate with their infants which are the basis of early communication skills and language development (Owens, 2008). Difference in social class have been found to impact children's cognitive and linguistic development due to such differences in family income, maternal and/or paternal areas of occupation, and education level which influence the amount and style of interacting with their children (Bradley & Corwyn, 2002; Hoff-Ginsberg, 1991). A study done by Erika Hoff-Ginsberg (1991) found that mothers of upper-middle-class status tend to interact and communicate with their children differently than mothers who are part of the working-class "due to the oppressive effects of economic deprivation and environmental stress on human interaction" (p. 794). The language the mothers of upper-middle-class produced during interaction with their children included longer utterances and a richer, more abundant vocabulary than the speech and language of the working-class mothers (Hoff-Ginsberg, 1991). It is suggested that mothers of low SES tend to talk less, spend less time in mutual play with their children, and use more directives (i.e. correcting or addressing behavior) than information enriching language when they do interact with their children than do mothers of higher socioeconomic backgrounds (Hoff-Ginsberg, 1991).

In addition, Owens (2008) explains that there is a difference in language use across socioeconomic classes. For example, higher SES class mothers who are better educated tend to be more verbal than mothers who are from a lower SES class. These characteristics are not universal as they

may differ across culture and especially across families of different socioeconomic classes. A study by Hoff (2003) compared children's vocabulary acquisition between families of high socioeconomic statuses to families of mid-socioeconomic status due to the difference in language learning experiences put forth by the parents. They found that mothers of high SES "produced more utterances, more word tokens, and more word types; had higher mean length of utterances; and produced more topic-continuing replies to their children than did the mid-SES mothers" (Hoff, 2003). It was suggested that these differences can be contributed to higher stress levels, less time for leisure, and less time for individual interaction time with their children from families who are of a lower SES class (Hoff, 2003). The research found that a 5% variance between the children's vocabulary acquisition was due to the differences in socioeconomic classes, although it was also suggested that if the two groups had been of high versus low SES classes, a greater variance would have been expected (Hoff, 2003).

Parents are the major language models in a developing infant's life. Hoff (2003) states that "for very young children whose mothers do not work outside the home, their mothers are the primary source of their language-learning experience." This puts a great amount of pressure on a parent to provide the best skills necessary to facilitate their child's developmental process. Goodwyn, Acredolo, and Brown (2000) found that parents are capable and adequate teachers of sign to their hearing children without any previous knowledge of American Sign Language. Their children learned an average of 20.4 signs through the length of the study (Goodwyn, Acredolo, & Brown, 2000). Howlett et al. (2010) examined the additional stress mothers place on themselves as a result of wanting the best for their children. Baby sign classes are an example of mothers trying to devote time and energy to facilitate language development in their children. This can be overwhelming and time consuming, placing unwanted stress on a new mother (Howlett et al., 2010).

Typical language development is influenced by the amount of exposure a child has to spoken language overall. Owen (2008) explains the development of communication begins in the form of

intentional gestures followed by the first words in order to establish a communication system between the child and parent. Depending on the amount of language exposure a child receives, language continues to flourish from combining gestures and words to fulfill more detailed communication needs followed by a rapid increase of vocabulary which reduces the need for gestures and complete reliance on verbal communication (Owens, 2008). Typical oral vocabulary development of children usually begins at approximately 8 to 12 months, consisting of the acquisition of the first word and the acquisition of a lexicon consisting of approximately 50 words by 18 months (Owens, 2008). When a child reaches approximately 350 words they began to combine words and progress at a rate 1 mean length of utterance (MLU) per year; 1 MLU by 1 year of age, 2 MLU by 2 years of age and so forth (Owens, 2008). The amount of time a mother spends communicating with their infant during these ages of language development allow the ages of development to vary causing some children to develop language at an earlier age and some at a later age. Any factors that may play a role in facilitating a child's language development would be of interest to mothers who are trying to decipher what their infants are trying to communicate to them.

### **Baby Signing Trend**

Baby signing has become a topic, now in the public eye, that is gaining more attention and is also growing among researchers. There have been many reports on public newscasts, newspaper articles, and magazines that are grabbing the attention of many mothers who are intrigued by its promoted advantages. Pizer et. al. (2007) touches on how sign language has become the "cool" thing among, not only new mothers trying to facilitate communication with their infant, but also among young adults who are showing more interest in sign language classes at the middle school and high school level. Newscasts such as CBC News in Canada and ABC's Good Morning America have promoted baby signing as a means of reducing frustration for a child who is trying to communicate before the age of

verbal development (typical age of first word acquisition) and increasing communication bond between mother and child ([www.cbc.ca/news/background/babysign](http://www.cbc.ca/news/background/babysign), [www.ABCNews.com/GMA](http://www.ABCNews.com/GMA), 2012).

People who are interested in the baby sign trend can easily search information via the internet and find many websites dedicated to baby signing that offer detailed information in an appealing way that's convinces readers of its advantages. Babysigns.com is a website that promotes a sign language program founded by Dr. Lisa Acredolo and Dr. Susan Goodwyn. This website provides research articles discussing baby signing's effects on a child's language development, social and emotional development, and its lasting effects of parent-child bonding ([www.babysigns.com](http://www.babysigns.com), 2012). Many products are offered to be purchased to help families get started including DVDs, flashcards, books, etc. The baby signing trend is not only in the United States, but worldwide. Another website, Tinytalk.com, is advertised as "The biggest and best baby signing organization in the UK, Ireland, and Australia" ([www.tinytalk.co.uk](http://www.tinytalk.co.uk), 2012). This website is similar to the previous one mentioned in that it provides information regarding baby signing's advantages and publicizes classes that are offered for the public. Additional information regarding certification requirements towards becoming an instructor of baby signing classes is available.

Further, as technology advances, many opportunities are available to learn about and incorporate sign language at any available moment. For example, as the Apple ipods, iphones, and ipads are becoming more and more popular, there are applications that have been developed strictly for teaching infants sign language. One program in particular is *Baby Sign ASL*, developed by Aaron Basil, which can be purchased for the iphone and contains 229 ASL signs selected to be appropriate for young children (Basil, 2012). *My Smart Hands Baby Sign Language Dictionary* is another program offered which provides "300 ASL signs that help you and your baby learn to communicate through signing." The iPhone is only one form of technology that is popular; there are many different products and companies that provide these services, allowing these programs to be available to the community. This availability of information is worldwide and will continue to grow as technology grows.

## **Gestures vs. American Sign Language (ASL)**

As children develop oral language the use of gestures is developed and is part of the normal language development. The use of gestures for communication typically precedes verbal language development. Children's first use of gestures is to gain attention and allow for language enriched exchanges between mother and child (Capone & McGregor, 2004). This is followed by the use of deictic gestures (including pointing or holding objects to call attention) which develop initially followed by more representational gestures and pantomime (using gestures to describe actions and/or objects) and eventually leads into gesture-word combinations as the child develops oral language (Capone & McGregor, 2004). According to Tellier (2009), gestures are used prelinguistically as well as in combination with verbal speech in later years to provide additional information of the message as well as more complex information that would be otherwise more difficult and lengthy in strictly verbal language.

American Sign Language (ASL) is a form of gesturing, as it is a form of manual communication. It does differ from the general definition of gestures because ASL is a language system which is rule governed. For this reason, it is not part of a child's typical language development like gestures are and is usually taught to children as a form of primary language, as in the deaf population. In contrast, gestures are not linguistically based; rather they supplement a spoken language and can be universal. ASL development is similar to the development of a spoken language, including onset of particular vocabulary and stages of later language development (Anderson & Reilly, 2002). Laura Ann Petitto (1994) explains that sign language consists of the same grammatical organizations, including phonetic, morphological, syntactic, semantic, and pragmatic complexities in different levels as oral language. Children learning sign language acquire the language at the same rate as hearing children would acquire spoken language and follow similar developmental milestones (Petitto, 1994).

## **Facilitating Language Development**

Research studies have shown that baby signing or the use of gestures with infants can facilitate language development due to the earlier development of gross motor control used in signing in comparison to the fine motor control required for vocalized productions of words (Holmes & Holmes, 1980 and Ozcaliskan & Goldin-Meadow, 2004). Visual signing and gesturing has been proven to have a positive effect on facilitating language development and typically has been shown to aid in advancing the onset of a child's first word, which typically occurs approximately 8 to 12 months of age (Goodwyn, Acredolo, & Brown, 2000). Goodwyn, Acredolo, and Brown (2000) examined the age of onset of the first word as a result of using gestures in addition to verbal language as a form of communication between a parent and child. In this study, children were exposed to age appropriate gestures and were given a language test at five different stages between the ages of 11 and 36 months. These results were then compared to two additional control groups to identify the effects gesturing had on language development. Results showed that the sign training group outperformed the participants from the two control groups in the verbal language testing. Eventually, there was not a significant difference as time increased toward the 36 month age which is most likely due to maturation and a learning curve. Initially, though, there was a significant difference in language development prior to the acquisition of one word utterances. In addition, the authors explain that the increase in verbal language could be a result of infant directed speech and child initiated conversations. It is probable that an adult would expand greatly on a subject or object that is known to be of interest to the child, rather than trying to have the child respond to an adult initiated conversation. Similarly, topic selection could also be a contributing factor. Topic selection is generated by the adult's assumption of their child's interests. As adults, we guess what infants are attending to, which could lead to elaboration or language stimulation regarding a topic that is of no interest to the child. Gestures help guide the caregiver toward the child's interests, which may help language comprehension and acquisition at a faster rate.

Holmes and Holmes (1980) proposed a theory that expressive language in sign and oral modalities are accelerated due to the exposure to signs in combination with spoken language. This study was a case study of an infant between the ages of 26 weeks to 17 months who was exposed to sign language as well as spoken English. The researchers tracked all expressive language development and specifically looked at type of utterance, phonological aspects, structural aspects, imitative versus spontaneous productions, and context of utterances. Information was compared to results from a previous study of spoken language development conducted by Nelson (1973). The researchers found that the children developed their first 10 words, consisting of both verbal and signed forms, 3.1 months earlier than would be expected in a typical verbal language development trajectory. The first 10 exclusively signed words and 10 exclusively verbal words developed 2.1 months early than previously recorded among this sample. The onset of the first 50 words were found to be acquired 5.6 months earlier, only verbal form 3.6 months earlier, and only signed form 4.3 months earlier. At 17 months the infant under observation had a total of 117 words, greater than typical developing children not exposed to sign language. In addition the authors noted that the first sign was observed to be produced at 6.2 months and was hypothesized that, again, gross motor control was more refined than fine motor control for speech.

Not only is sign language a benefit in the early months prior to acquiring a first word, but research done by Ozcaliskan and Goldin-Meadow (2004) has shown that gestures can be used in combination with words to produce more complex utterances. This study looked at children who had already acquired one word utterances and were using them in combination with gestures to produce more complex multi-word utterances even though they had not reached the developmental age that is typical for acquiring multi-word utterances (i.e. 2 years typically for 2 word utterances). This opens the door for additional language input from a parent or caregiver who is more likely to elaborate on a child's gesture and word combination producing a correct simple sentence and providing the correct spoken

word to add to the child's vocabulary. It is suggested that gesture-speech combinations used to create simple sentences in different formats prove that children understand the requirements to compose a sentence (predicates and arguments) to convey meaning or intent (Ozcaliskan & Goldin-Meadow, 2004). This also leads to the idea that higher cognitive capabilities are present prior to the complete acquisition of physical fine motor control.

A supporting study by Goldin-Meadow (2009) refers to previously conducted studies, including Ozcaliskan and Goldin-Meadow (2004), to elaborate on how gestures can be a "window into a child's mind before they can verbalize their first word" (p. 110). This aids in the facilitation of communication and understanding a child's wants or needs before their ability to express them verbally. It is further suggested that gestures can also serve as an indicator of later language skills based on their finding that the more gestures produced at 14 months, the larger the child's vocabulary would be at 42 months (Goldin-Meadow, 2009). Capirci et al. (as cited by Capone and McGregor (2004)), found similar results showing the amount of single gestures and gesture-word combinations, including deictic gestures with representational words, were produced by children around 16 months correlated with the amount oral vocabulary the child had at 20 months.

### **Purpose of Study**

The purpose of this study is to compare two forms of communication, American Sign Language and Gestural Communication to identify any preference mothers and their children have on using them during the language development ages of the child's life and the extent to which mothers from low SES backgrounds will use signs in the home environment to support and facilitate their child's acquisition of verbal language. There are three research questions attributed to the current study: 1. Will children from low SES backgrounds use more ASL signs or gestures when exposed to instructional interactions with their mothers? 2. Will mothers from low SES backgrounds extend the ASL training session into the home environment? 3. Which training will be more preferred by the mothers, ASL or gestures?

Research studies that have been done regarding the benefits that baby sign have primarily consisted of Caucasian middle class or upper middle class participants that have been seeking information that will benefit their children's development (i.e. Goodwyn & Acredolo, 1993; Goodwyn & Acredolo, 2000). Some mothers have the advantage of being a "stay at home mom" and are able to focus most of their attention on their children and their development, a luxury that is not typically experienced in a family of lower socioeconomic status. Because children who come from low SES backgrounds may not be exposed to as much verbal language, it may affect the language skills they are able to attain. This study is aimed at teaching ASL techniques to mother from low SES backgrounds so they can in turn teach ASL to their children as an attempt to increase their language skills.

Two training classes were conducted with mothers and infants to ensure proper production and measure of sign language output from the children. It was hypothesized that by the end of the training sessions, the children would produce more ASL signs than gestures following interactions with their mothers. It was expected that the mothers would extend the ASL use into the home environment after learning the effects of ASL and gestures on verbal language acquisition and would be supported by instructional material that the families would be able to review in the home environment. Participants should find that using sign language in combination with oral speech will facilitate communication between infants and parents, easing frustration, as well as facilitating language development within the child. Further, it was hypothesized that the mothers would prefer instructional training of the ASL condition over the gestural training session.

## **METHODS**

### **Participants**

The participants of this study were sought out intentionally to be of low socioeconomic status. Due to this requirement, a local non-profit organization was approached, presented with the research literature and purpose, and requested the participation of their members. AVANCE Inc. is a private non-profit organization based in San Antonio, TX. There are different chapters around the U.S. Southwest. In El Paso, the local chapter became the site of choice to locate participants. This program reaches out to the El Paso community and focuses on “educating parents to be the first and the most important teachers of children” ([www.avance-elpaso.org](http://www.avance-elpaso.org)). They provide parenting classes, as well as English as a Second Language (ESL) and GED classes, to needy parents of low socioeconomic status in the attempt to provide support and education to lead a better life.

Two pre-established classes were used to distinguish the two groups. Each sessions consisted of approximately 22 mother-child pairs each, with the children ranging between 0 and 5 years of age, mean age of 2 years and 3 months. Group A consisted of 24 mothers and 27 children (few mothers who had more than one child). Group B consisted of 17 mothers and 18 children. All group members reported being of low socioeconomic status and the children who had not been introduced to sign language nor were informed of its benefits towards language development, ranged between 0 and 5 years of age. The children did not have any known developmental disorders nor have been exposed to sign language (as per parent report) prior to the study.

### **Research Design**

A crossover group design was applied to the investigation. Two different classes consisted of two similar groups of participants that were compared. Both groups were given two separate

instructional sessions, one consisting of teaching American Sign Language signs and one consisting of gestural communication in the form of finger plays, resulting in 4 training sessions total. Presentation of the treatments, ASL training and gestural communication training, will be counterbalanced for each group to ensure that there will be no effect for the order of presentation. Table 1.1 is a visual representation of the research design.

Table 1.1

Crossover Design

	Class 1	Class 2
Group 1	ASL Training	Gestural Communication
Group 2	Gestural Communication	ASL Training

**Educational presentation**

Because the area of research supporting this study revolves around language development, it was determined that the participants of the study would benefit from receiving general language development information for their young children. Since the groups were both seen twice, with one month separating the two different treatment sessions, it was decided that each session be preceded with an educational presentation that may be of interest to parents for their developing children. The initial information that was presented included infant language milestones up to age 5 as well as communicative interactions and play milestones that are typical in the early years. The second presentation was given at the time of the second session and consisted of some warning signs of language delay or disorder, what parents should do if concerned their child may be exhibiting these signs, as well as indications of the highly diagnosed disorder of Autism. It was important that these mothers receive some preventative information because a lack of education may account for language

delays occurring in their children because mothers may not have the knowledge or education to know the developmental process or when they should seek help.

## **Training Sessions**

### **Class 1, Group 1.**

Following the presentation on normal language development, the mothers of group 1 received information regarding gestural communication and how it may supplement normal language development in hearing children. The mothers were then joined with their children, who were situated in a daycare-type setting during the lecture presentation, and were jointly taught finger play songs, examples can be found in Appendix A. Due to limited time, only the Spanish fingerplay songs were presented, however additional English fingerplay songs were provided in the take home DVD for further review at the participant's discretion. Each fingerplay song presented was rehearsed 2 to 3 times with mothers and children until they were comfortable enough to sing the songs with the children alone. All songs that were chosen to be taught were presented in the same manner. Participant pairs were monitored for correct gestural productions and any attempt the child made to produce the target gesture or approximation during the fingerplay song and/or spoken target word were recorded.

Because of the size of group and time of the session, the actual training session lasted approximately 45 minutes, was recorded in its entirety, and was terminated as the children became restless and uncooperative. The mothers were then given a DVD containing all the fingerplay songs and were instructed to use the fingerplay songs to interact with their children at the most natural times throughout the day without forceful interaction times. They were encouraged to watch the video to review the songs and learn different fingerplays as needed or wanted.

### **Class 1, Group 2.**

Group 2 was presented with the same language development presentation, previously described for Group 1, and was followed by information regarding American Sign Language (ASL) and its potential to support normal language development when used with normally developing, hearing children. Anderson & Reilly (2002) provided normative data regarding the acquisition of American Sign Language signs and English vocabulary. The target signs chosen were based on recommendation from this study and were found to be the typical vocabulary developed early in both ASL and English (Anderson & Reilly, 2002) The signs included *Daddy, Mommy, bye, ball, baby, no, shoe, milk, cookie, cat, dog, more, eat/food, drink, bird, cracker, banana, diaper, grandma, rabbit, clap, finish/all done, cow, hat, horse, book, duck, cry, bath/wash, fish, tree, kiss, sleep, rain*. Additional signs were also chosen based on most typically used with children which included *water, potty, blanket/cold, pacifier, toy, bubbles, love, clean, hurt, outside, sun, moon, stars, morning, afternoon, night* and any other signs requested by the mothers. A list of ASL signs used in the current study can also be found in Appendix B. All signs were taught to the mothers while their children remained secluded from the presentation and were reviewed 2 to 3 times to ensure knowledge of the signs. Each mother was provided with a handout which included pictures showing them how to produce each sign which could be reviewed as needed.

Following the training session, the mothers were reunited with their infants and instructed to interact with their children using books (either reading or simply discussing pictures) that had been marked with stickers at every location a sign could have been used. Each participant pair was monitored for correct production of the sign. Any attempts the child made at forming the sign and/or spoken target word were calculated. Again, the interactive session with the children lasted until the children fatigued and became restless and uncooperative, approximately 45 minutes. The interaction was videotaped for later data collection. Upon ending the class, the mothers were instructed to use the signs throughout the day when possible at the most natural times such as during bath time or bedtime. It was stressed again

that teaching the signs to their children should not be forced, but rather used in natural communication. They were also encouraged to use the ASL hand out provided to review any signs at home.

### **Class 2, Group 1.**

During the second treatment session, Group 1 was presented with information regarding signs of possible language delay or disorder, who to contact with concerns, as well as information on signs of Autism in the hopes that these mothers would be able to seek help if ever needed. The group was then provided the ASL training session as previously described. They were also provided with the same ASL handout and same stimulus books to interact with their children. Mother-child pairs were observed for correct sign production and any sign approximations the children produced or spoken words were recorded.

### **Class 2, Group 2.**

Group 2 was also presented with the language delay or disorder presentation and then provided with the same fingerplay songs that group 1 was presented with during class 1. The presentation of the fingerplay songs was changed slightly such that the songs were taught and practiced with the mothers before they were joined with their infants. The songs were practiced 2 to 3 times with the mothers and then the mothers were instructed to interact with their child using the fingerplay songs. The participants were observed for correct gestural productions and any approximations of gestural communication from the child were recorded. The session was video recorded for later data collection.

The dependent variables were any gestures or signs produced by the children while interacting with their mothers. The data collection process was consistent in both groups such that mother interactions were observed and any gestures produced by the children during the interactions were recorded. This type of data collection allowed for a comparison within and between participants to learn a sign and how often they were able to produce it communicatively. A recorded DVD instructional

video of the fingerplays and handout packet of ASL signs were provided to each participant following the appropriate training sessions to encourage implementation outside of the research study.

## **Surveys**

A variety of surveys were used throughout the study to collect important information from the participants. Prior to the first treatment presentations, mothers were given a Language Development survey to identify current language skills their children were using. Questions produced responses to elaborate on how the child most often communicates, how many words they are using, which words they are using, and how many words are used in combination. This survey was again provided before the second session and one month following the final session to collect information on language development following the treatment sessions. A Rate the Training survey was provided following each of the two treatment sessions to collect information on the usefulness of the information presented and the participant's opinion on the appropriateness and ease of using the treatments with their children.

Following the training sessions, the investigators re-visited the parenting classes provided by the AVANCE program to conduct a follow-up survey with the participants to analyze their use of target signs in the home environment and collect the participant's opinion of the training session and its benefits. The survey consisted of 12 statements and questions. The survey was administered in the classroom at 1, 3, and 5 months post final training session. The data collected during each survey was compared between groups, across time to visualize a trend of the changes of sign implementation, amount of sign production, and opinion of the information as time increases post training. This allowed for an analysis of an overall trend of increased, decreased, or maintained level of continuing the sign language skills presented during the training sessions.

## **Data Analysis**

The data collected was analyzed quantitatively between groups and age categories. ASL signs as well as gestures produced by each child were tallied and compared and contrasted accordingly. In particular, the amount of different signs and gestures the children are able to use were of interest, as well as the total amount of signs and gestures produced during the duration of each session. A series of one and two tailed t-tests were run to find significant differences between ASL and gesture productions within as well as between groups.

Similarly, the data that was collected from the follow-up surveys was also qualitatively analyzed to identify any possible trends of sign language use in the home environment over time. The data collected was graphed to provide a visual trend. Finally the results obtained by the rating of the training sessions were graphed in order to identify the mothers' opinion/preference between the ASL training session and the gestures training session.

## **Reliability**

Inter-rater reliability was measured with help of a fellow graduate student clinician. The total amount of time between all collected video recordings was calculated and 30% of total time, 318 minutes, were reviewed for inter-rater reliability. The rater was trained with the ASL signs used in the study as well as the fingerplay gestures in order to identify correct productions. Random segments of each video were selected for data collection in which the primary investigator and secondary rater viewed simultaneously followed by a comparison of the data collected. Disagreements between data collection included differences among identification of sign or gesture production as well those that were omitted. Total number of agreements were calculated and divided by total number of signs produced. There were 242 total signs accounted for with 27 disagreements and 215 agreements, signs or gestures that were the same between the data sets. Inter-rater reliability was calculated at 88.8% agreement.

## RESULTS

### Objective Data

The primary research questions deal with the ability of low SES children to use ASL or gestures through instructional interactions with their mothers. Upon analyzing the data collected, the total amount of signs and gestures produced by the children were gathered and compared. Table 4.1 summarizes the number of signs used within each group and compares it with the number of gestures used. It further identifies the usage of ASL and gestures within the duration of the sessions (total amount of signs/gestures produced during parent interactions of training sessions). It can be seen that in both groups there was a higher count of different ASL signs learned in comparison to gestures, although a greater difference was seen in Group 2.

Table 4.1

Signs and Gestures Produced by the Children

	Group	Comparison		
	Total different ASL signs produced	Total different gestures produced	Total ASL signs produced	Total gestures produced
<b>Group 1</b>	251	200	340	385
<b>Group 2</b>	161	11	229	11

The children in Group 1 produced a total of 251 different signs and 200 different gestures, only different signs produced by the children were tallied and any duplicate signs produced were not included in this total. The children in Group 2 produced 161 different signs and only 11 different gestures. The last two columns of Table 4.1 compare the complete count of signs and gestures produced within the time frame of the sessions. This total includes any duplicate signs or gestures produced by the children.

When compared, Group 1 produced a fewer amount of total ASL signs during the session than gestures produced during the gesture training. Whereas with Group 2, there was an inverse relationship in that group 2 produced a higher total ASL count than gesture count.

Further analysis of the collected data allowed for comparison of used ASL signs and gestures between age groups. The age range of children within both groups ranged from 0 to 5 years of age. In order to get an idea of the extent of capability differences between those children who were in the earlier stages of language development than those who most likely already had a sufficient vocabulary, children were grouped into two different categories by age, those 2 years of age and under and those between the ages of 3 and 5. Table 4.2 summarizes ASL sign counts and gestures counts for two age groups identified within both Groups 1 and 2.

Table 4.2

Number of signs and gestures used between ages within the groups

<b>Group1</b>	<b>n=</b>	<b>ASL signs used</b>	<b>Gestures used</b>
<b>0-2 years</b>	15	82	115
<b>3-5 years</b>	9	169	120
<b>Group 2</b>	<b>n=</b>	<b>Used ASL</b>	<b>Used gestures</b>
<b>0-2 years</b>	8	69	2
<b>3-5 years</b>	3	33	11

Because the numbers of participants within the age groups vary substantially, a true representation of the ability to use signs and gestures by age is not apparent when considering only total count. Therefore a ratio of signs per child was calculated by dividing the number of signs or gestures used by the number of participants (n) within the category in order to recognize the difference in sign and gesture used between age groups. Results can be seen in Table 4.3. The 3-5 year old categories outperformed the 0-2 year olds in using both ASL signs and gestures within both groups. In Group 1, the

ratio of sign to child in the 3-5 year old category is approximately 19 signs per child and the gesture ratio is approximately 13 gestures per child. In Group 2, the ratio of sign per child in the 3-5 year old category is 11 signs per child and 3 gestures per child. The ratio of sign to child in the 0-2 year old category of Group 1 is approximately 5 signs per child and gestures ratio is approximately 8 gestures per child. Within Group 2, the ratio of sign per child in the 0-2 year old category is approximately 9 signs per child and the gesture ratio is less than 1 gesture per child (0.25). It is however obvious that there is a large variance in the gestures learned within Group 1 versus the amount learned within Group 2. Possibilities for this variability will be discussed in the following section. The 3-5 year old category in Group 1 and both age groups within Group 2 show to have a higher number of ASL signs that were learned in comparison to the gestures. Only the 0-2 year old group within Group 1 shows otherwise, in that there was a higher rate of gestures learned in comparison to ASL signs.

Table 4.3

Sign and Gesture ratio of children in separate age categories within each group

	Group 1		Group 2	
	Sign Ratio	Gesture Ratio	Sign Ratio	Gesture Ratio
<b>0-2 years</b>	5	8	9	<1
<b>3-5 years</b>	19	13	11	3

### **Statistical Analysis.**

Series of T-Tests were applied to find any significant differences between ASL and gesture production within the groups, between the groups, and between ages within and between groups. Results from the T-Tests can be found in Tables 4.4 and 4.5 showing comparison between groups within groups and between groups respectively. One tailed paired T-Tests were used to analyze the data within the groups because it was hypothesized that the children would produce a greater amount of ASL

signs in comparison to gestures and that children between the ages of 3-5 years would produce a greater amount of both ASL signs and gestures when compared to the productions of children between the ages of 0-2 years. Significant differences were found when comparing Group 1 ASL between ages and gestures between ages with p-values equaling 0.002 and 0.018 respectively. Significant differences were also found when comparing the data from Group 2 ASL and gestures productions and gestures productions between ages with p-values equaling 0.002 and 0.042 respectively. The remaining p-values obtained comparing ASL and gesture productions in Group 1 and ASL productions in Group 2 between ages were found to be insignificant with p-values found to be 0.096 and 0.355 respectively.

Two tailed unpaired independent T-Tests were used to analyze the data between groups because there were no significant differences anticipated to be found between the groups due to the equal balance of participants between groups. Significant differences were found for the gesture productions between the groups, gesture productions between 0-2 year olds between the groups, and gesture productions between 3-5 year olds between the groups with p-values equaling 0.003, 0.001, and 0.028 respectively. The remaining data points compared, ASL productions between groups, ASL productions between 0-2 year olds between the groups, and ASL productions between 3-5 year olds between the groups were found to be insignificant with p-values equaling 0.603, 0.352, and 0.103 respectively. Unexpected values obtained will be discussed in the following section.

Table 4.4

One Tailed Paired T-Tests within groups

<i>Data Compared Within Groups</i>	<i>One Tailed Paired T-Tests Results</i>
<b>Group 1 ASL vs Gestures</b>	p=0.096
<b>Group 1 ASL between ages</b>	p=0.002*
<b>Group 1 Gestures between ages</b>	p=0.018*

<b>Group 2 ASL vs Gestures</b>	p=0.002*
<b>Group 2 ASL between ages</b>	p=0.355
<b>Group 2 Gestures between ages</b>	p=0.042*

Table 4.5

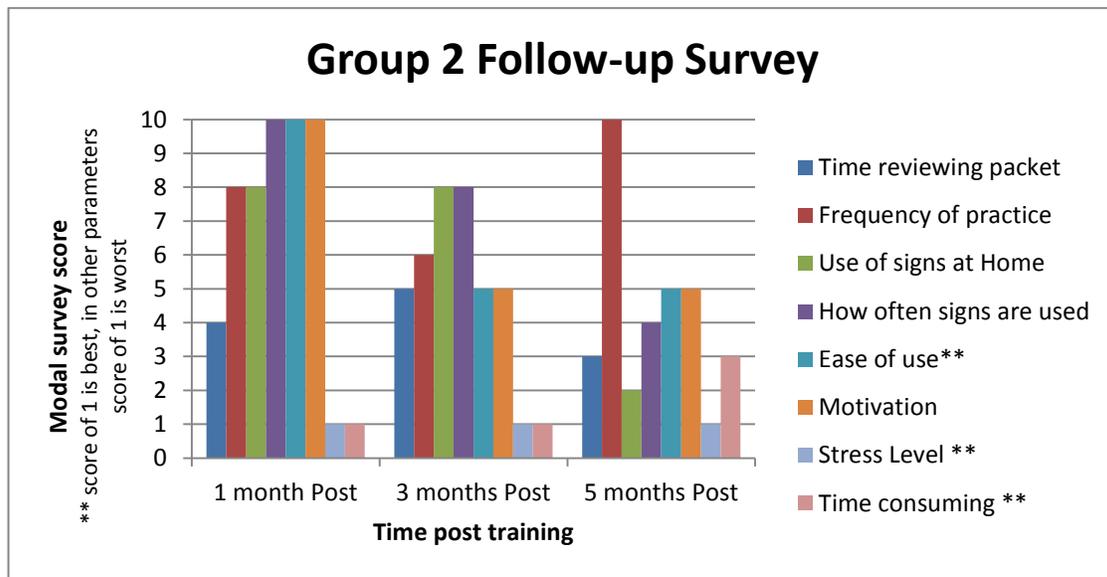
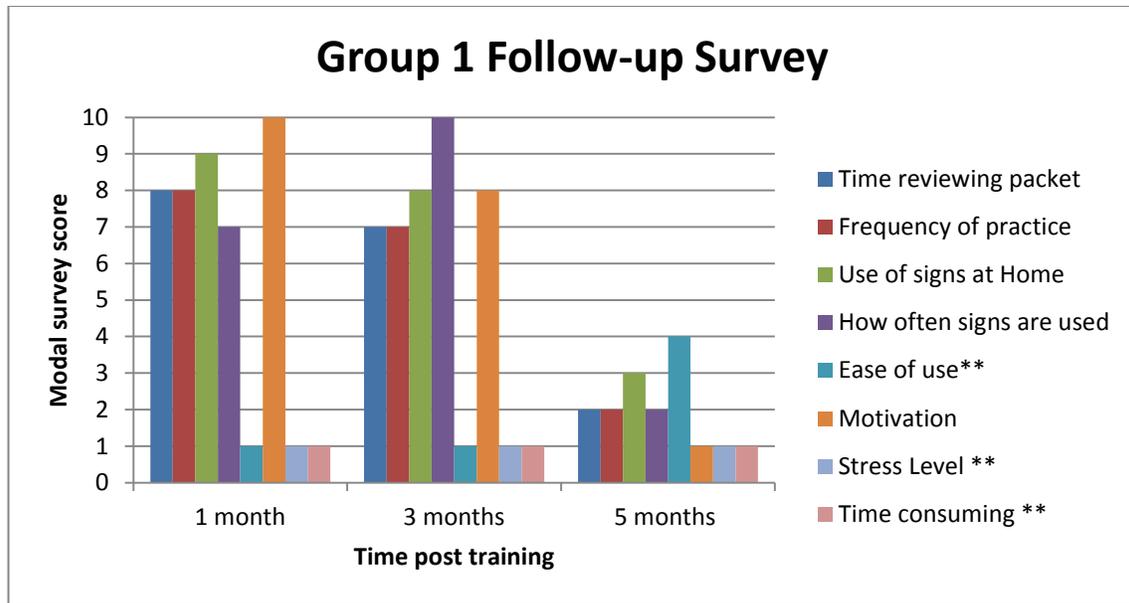
Two Tailed Unpaired T-Tests between groups

<i>Data Compared Between Groups</i>	<i>Two-Tailed Unpaired T-Test Results</i>
<b>ASL productions</b>	p=0.603
<b>ASL productions between 0-2 yr</b>	p=0.352
<b>ASL productions between 3-5 yr</b>	p=0.103
<b>Gesture productions</b>	p=0.003*
<b>Gesture productions between 0-2 yr</b>	p=0.001*
<b>Gesture productions between 3-5 yr</b>	p=0.028*

The second goal of this project was to identify the extent to which the ASL training session would be extended into the child’s home environment. The data obtained from the follow-up surveys at 1, 3, and 5 months post training sessions were gathered and recorded to identify a trend over time of the parents continued use of sign. Figure 4.1 shows a trend over time within different parameters of sign language use. The survey results are presented according to group. Over a period of 5 months, the trend in Group 1 shows 4 parameters that can be seen to be declining. Motivation to continue using sign in the home, the amount of signs used in the home, the frequency of practice, and the amount of time reviewing the ASL packet were all reduced. Motivation declined from a score of 10, to a score of 8, to a score of 1 over 5 months post training.

Figure 4.1

Use of sign in the home environment as time increased post training sessions.



In parameters indicated with \*\*, score of 1 is best. Other parameters score of 1 is worst

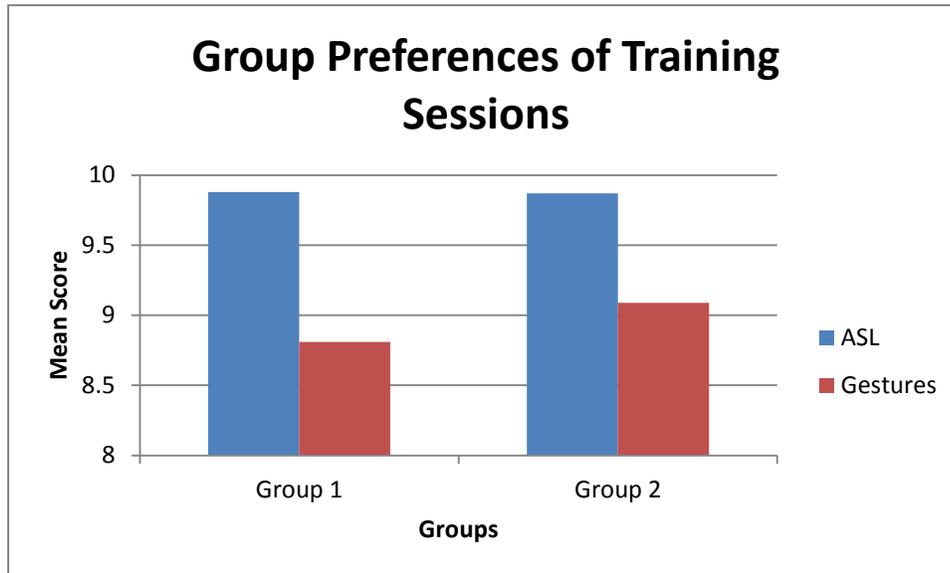
The other parameters (the amount of signs used in the home, the frequency of practice, and the amount of time reviewing the ASL packet) declined by one rating over two months and then down an additional 5 points following an additional 2 month time period. It can be observed however, that the amount of time that signs were used actually increased from a score of 7 to a score of 10 within three

months post training followed by a decrease to a rating of 2 by the end of the 5 months. The ease of using ASL was rated the same at 1 and 3 months post training with a score of 1 and then increased to a score of 4 after the 5 month period post training. The remaining 2 parameters (level of time required and level of stress) remained the same across the 5 month period. Group 2 showed slight differences in trends of ASL use over the 5 month period. The frequency of sign use decreased at each rating period from a score of 10, to 8, to 4 over the allotted time which is different from the trend seen in Group 1 with a slight increase in the use of sign within 3 months following the trainings and then a decrease as time increased. The Motivation and Ease of use parameter decreased the most, from a score of 10 to a score of 5 at the 3 month mark and remaining consistent through the 5 month mark. Finding ASL time consuming remained low at 1 and 3 months post training followed by an increase in 2 rating levels showing that using ASL in the home became more time consuming over time. The amount of time in reviewing the ASL signs provided for home use increased within 3 months following the training and then decreased as time increased post treatment. The stress level remained consistently low across the 5 month period. The frequency of practice however seems to show an inconsistent trend as the frequency decreased from 1 to 3 months post training followed by an increase to a rating of 10 at 5 months post training.

The final research question brought forth through this study was in regard to the parents' preference of the ASL or gestures training sessions in hopes of use with their children. A rating survey was provided following both ASL and gesture trainings to get their opinion of the presented material. Figure 4.2 provides information on the preferences of the participants. Both Groups 1 and 2 showed a slightly higher preference of the ASL training session in comparison to the Fingerplay session. This is of importance when planning to use ASL or gestures to facilitate language development such that the parent's willingness to participate will directly impact the successfulness of language growth.

Figure 4.2

Mothers' rating of both conditions



## Subjective Data

### Language Development Changes.

The language development surveys were completed by the parents and are subjective by nature. The surveys were completed prior to each condition as well as following each condition, totaling to 3 surveys per child. There were a total of 17 complete language development survey sets collected from Group 1 and only 7 complete language development surveys collected in Group 2. . The surveys indicated a change in some of the children's language following both gestures and ASL conditions. In Group 1, following the Fingerplay condition, there were 5 children who had a change in their communication behaviors including reduced crying and changes in either pointing or an increase in word usage. Other descriptions of communication changes included clearer word productions, and use of complete words versus syllables. Eleven of the children were reported to have an increase of vocabulary (words specified on language survey) and seven were reported using new phrases.

Following the ASL condition, seven children were reported to have an increase in vocabulary by means of new word production and two children reported to be using new phrases. One child, a 9 month old female was reported to be using a few ASL signs (i.e. *mama* and *papa*) for communicative purposes. In Group 2, following the ASL condition, one child was reported to have a change in communication behaviors by means of reduced crying and an increase in pointing. Four children developed new words and two children developed new phrases. There were two children whose mothers reported using ASL signs for communication, a 2 year 9 month old female and a 1 year 6 month old female. Signs reported being used included *mommy*, *daddy*, *grandma*, *grandpa*, *shoe*, *dog*, *cat*, *water*, *please*, and *duck*. Following the gestures condition, 4 children were reported to have shown an increase in vocabulary and two children had an increase in phrase production. Three children were noted to have no change following the gesture condition in this group.

### **Child Parent Interactions.**

During the data analysis of the recorded ASL and gesture sessions there were obvious differences in parent and child behaviors between the two conditions. Both sessions progressed until the children or mothers exhausted, preventing any further use of the signs or gestures. There were differences between the duration of the sessions between the conditions. On average, Group 1 sustained participation in the gesture session for 32 minutes and 9 seconds and in the ASL session for 40 minutes and 39 seconds. Group 2 sustained participation in the gesture session for 21 minutes and 10 seconds and the ASL session for 34 minutes and 17 seconds. The duration of the ASL session in both groups was longer in duration than the gesture sessions. In addition to the observed difference, there were differences in the behaviors and toleration of the children through the sessions as well. In Group 1 there were a total of 2 children who did not produce any signs throughout the ASL condition and 6 children who did not produce any gestures throughout the gesture condition. In Group 2 there was a total of 1 child who did not produce any signs and a total of 10 children who did not produce any gestures during

the gesture session. These children were observed to be crying, occupied by other activity (i.e. coloring with pens provided by mother), or the parent was not interacting with the child even with student clinician guidance. Through the duration of the gestures sessions, there were numerous children who were not participating and who were crying. The mothers required coaxing to begin using the fingerplay songs and even after encouragement from student clinician, some mothers required the student clinicians to sing along with them as a group in order to use the fingerplays. There were children with their heads on the table and nodding head “no” as a refusal to sing along. Through the duration of the ASL session, there was less crying observed and an overall higher interest in the books and ASL signs in both the mothers and children.

## **DISCUSSION**

The aim of the current study was three fold. The researcher wished to answer the following three questions: 1. Will children from low SES backgrounds use more ASL signs or gestures when exposed to instructional interactions with their mothers? 2. Will mothers from low SES backgrounds extend the ASL training session into the home environment? 3. Which training will be more preferred by the mothers, ASL or gestures? The data presented here demonstrates the ability of young children to use ASL signs and/or gestures during the period of language development as well as the parent's ability to use ASL signs and gestures in their home environment to support their child's normal language development. The opinions of the mothers toward the ASL and gesture training was an important piece of this study because if used in the future, a parents' support for a particular treatment would directly impact its effects as the parent's would most likely be more accepting of the treatment and willing to use it in the home. The data was collected in two parts, signs and gestures produced by the children and the mothers' use of signs and gestures in the home environment following the training session. The children's productions will be discussed first.

### **Child ASL and Gesture Productions**

It was shown that there were a higher number of different ASL signs used than gestures in both groups of participants and in Group 2 there were also a higher number of total ASL signs produced than gestures. In Group 1 however, there were a higher number of total gesture signs produced than ASL signs. A similar difference can be seen between the age categories within the groups. Group 1 also had a higher number of gestures produced by both age categories in comparison to Group 2. This difference may be attributed to the fact that there was a change in the methods in the presentation of the gestures between Groups 1 and 2. Group 1 received the fingerplay training first and each song was taught to the mothers and children together in the same room. The mothers were then given time to teach the song and interact with their children using the gestures before another song was introduced. It was observed

that this created a classroom type setting and the children were being taught the songs by the student clinicians who were instructing and the mothers were then relying on the students to lead the songs throughout the session. Because the purpose of the training session was to teach the mothers who were then supposed to teach their children, the methods were altered for Group 2 so that the mothers were taught all the fingerplay songs prior to introducing them to their children. The difference seen between the children's gesture production in Group 1 and the gesture productions in Group 2 may be attributed to this change.

In addition to the high total gesture count in Group 1 being affected by the training methods used, the context in which the gestures were taught also impact their usage. The gestures were taught in the form of fingerplays such that a variety of gestures were incorporated into one song. As children began to use the fingerplay songs, it was inevitable that children would produce multiple gestures per song. In comparison, the ASL signs were taught separately and were able to be used in many contexts such as reading books or natural conversation. Each time a child used an ASL sign, it was not impacted by a context that would lead them to produce multiple signs consecutively.

Differences between age categories within the groups can be seen in Table 4.2. The groups consisted of a wide range of ages and when separated into the two age categories, the differences in age impact the sign and gesture production between the children. It was found that the children in the age range of 3-5 produced more ASL signs and gestures than the children 2 years and under in both groups. This ability for slightly older children to produce such a high number of signs and gestures is accelerated by their advanced level of language development. Owens (2008) explains the language development process and how extensive each year of development is. Between the ages of 0-2 years, milestones include a child's first word around 12 months and can develop up to 50 words by 18 months (Owens 2008). Comparing a child in the early stages of language development to a child 3 to 5 years of age who may have a vocabulary of 900-1000 and upward to 2200 words and can be using sentences containing 3

to 5+ words shows how much of an advantage the older children have and how much language has already developed (Owens, 2008). The higher language developed in the older children allow them to learn signs and/or gestures and attach meaning much quicker than younger children lower in the language development process.

### **Statistical Analysis**

The results obtained from the series of T-Tests used to analyze the group data supports previously explained results found within and between the groups. Expected T-Test values included significant differences in: ASL productions between ages within Group 1, Gesture productions between ages within Group 1, ASL versus gesture productions in Group 2, and gestures productions between ages within Group 2. Expected insignificant results include no significant difference in ASL productions between groups, ASL productions between 0-2 year olds between groups, and ASL productions between 3-5 year old categories between groups.

There were unexpected results found following calculation of t-test which included significant differences in gesture productions between groups, between 0-2 year olds between groups, and between 3-5 year olds between groups, as well as no significant difference found between ASL signs produced and gestures produced within Group 1. This can be explained again by the difference in methods used to teach the fingerplays to the participants. It is believed that if the fingerplays were instructed to the mothers of Group 1 prior to interacting with their children as was done with Group 2, there would have been no significant difference in gestures produced between the two groups or ages. The p-value calculated for ASL signs produced between children by age in Group 2 ( $p=0.355$ ) was also unexpected and can be explained by two participants in the 0-2 year old range who produced a substantially higher number of ASL signs than the other participants of that age range. These particular children were in the upper 2 year old range and because they produced a greater number of ASL signs, when compared with the 3-5 year old children's productions, no significant difference was found.

## **ASL in the home environment**

The researcher's hypothesis was not supported by the collected results overall. Even after providing material for reviewing the information at home, there were aspects in both Groups 1 and 2 indicating that the use of ASL in the home environment eventually decreased. It is positive however that initially following the training sessions there were aspects of using signs in the home environment that remained high, but as time increased, the use of ASL decreased overall. This can be expected as children continue to develop oral language, the use and support of ASL would diminish as they would rely solely on oral language, the most efficient form of communication.

The surveys from Group 1 show some aspects of ASL use decreasing. Aspects of motivation, use of signs at home, frequency of practice, and the amount of time reviewing the packet all decreased across time. The level of time consumption required to use ASL in the home and the stress level remained consistent through the 5 months showing that these aspects were not factors that prevented the use of ASL in the home environment. One increase in rating was for how often their children used signs at 1 and 3 months post training followed by a decrease from 3 to 5 months. This indicates that initially the mothers continued to support the use of ASL in the home but as time increased, the use of signs eventually decreased. This can be expected due to simple development of verbal language in that children learning sign and verbal language will eventually use the least restrictive form of communication, in this case verbal language and decrease their use of sign.

In Group 2, similar results were found. Ratings for stress level remained the same while finding ASL time consuming stayed consistent from 1 to 3 months and then increased from 3 to 5 months. Motivation to use ASL and ease of use decreased and then remained consistent showing that these aspects of using ASL may continue to remain consistent as time progresses. How often signs were used steadily decreased across the 5 months and may continue decreasing as the children learned and used more verbal language. Frequency of practice surprisingly decreased from 1 to 3 months and then

increased substantially to a rating of 10 after the 5 month period indicating that although ASL may be decreasing in use, the mothers and children continue to practice them independently. Finally, the rating for time used to review the packet increased from 1 to 3 months, showing that mothers were still interested in learning and using sign as they were ensuring they knew and used the ASL signs correctly, followed by a decrease in rating by the 5<sup>th</sup> month. This can either be secondary to the decrease in the use of ASL, or consistent with the increased rating in frequency of practice leading to believe that the mothers no longer needed to review the packet to learn the signs and were producing the signs from memory. The change seen over time in the use of signs at home was suspected to decline in certain parameters including motivation, time used reviewing the packet, and time practicing. As language continues to develop and children begin to use more words the frequency of using ASL and willingness to continue practicing would decline because oral language is the most efficient form of communication.

Because stress level remained consistent in Group 1 and Group 2, it can be suggested that mothers did not find using ASL with their children stressful and is not a factor in the decreased use of ASL in the home environment. As suggested by Howlett et al. (2010) that mothers who use signing with their young children find it stressful and anxiety provoking is not supported within the results obtained by the current study. Howlett et al. (2010) describes the mothers who participated in his study as high anxiety and constantly seeking the best for their children. They also suggest that these mothers possibly had pre-existing levels of stress and anxiety. These characteristics vary from person to person and after analyzing the stress levels as reported by the mothers of this study reveal that high stress due to using ASL is not consistent across all mothers. Stress depends on personality characteristics and whether one is naturally an anxious person or has a high stress personality to begin with.

### **ASL or Gestures?**

A rating survey completed by the participants identified the mothers overall opinions of both training sessions. Figure 4.2 shows the results from this survey. There was a slight preference toward

the ASL training sessions versus the gestures training session. In addition to the surveys, behaviors during the training sessions described in the previous section (i.e. refusal to participate, high levels of crying, and the difference in length of both sessions due to child tolerance) also lead us to believe that a preference existed among children as well. Even though the numbers may not show a significant difference in terms of language changes and sign versus gesture use, the preference of ASL over gestures shows that if one of these conditions were to be used, ASL may be the most effective treatment option if the parent is more accepting of the treatment and would increase the chances of the parents extending the behaviors into the home environment. In addition, the children's preference is just as important because it is the child who would be the active participant in the treatment process and the more cooperative and enthusiastic the child is toward the treatment the higher the chances for successful outcomes.

As previously mentioned, research concluding the notion that baby sign facilitates language development have consisted of participants of middle class, mainly Caucasian, subjects (Goodwyn & Acredolo, 2000, Goodwyn & Acredolo, 1993). The participants of the present study are currently enrolled in the AVANCE program, considered to be of a low socioeconomic status and are seeking ways to better their current living situation. Mothers of a lower socioeconomic status are at a disadvantage educationally and economically in comparison to higher educated mothers who have higher paying jobs and are more economically situated (McLoyd, 1998). Hoff (2003) found that mothers of lower socioeconomic status differ in the quantity of language used, lexical richness, and sentence complexity when interacting with their infants. Taking time to learn how to better communicate with an infant provides mothers with an opportunity to facilitate their child's language development. Using American Sign Language may be an additional opportunity to increase communication between young children and parents prior to the development of oral language and, further, facilitate language development.

### **Limitations**

Due to the nature of the study and the population involved, limitations exist that may have interfered with the collected results. First, the population selected was a sample of convenience and was enrolled in a parenting class with the AVANCE program. Unfortunately, there was a high attrition rate in Group 2 as participants discontinued the parenting classes. There were also new mothers who enrolled in the program and entered our study after the first round of data collection and training session. The data collected from these participants were unable to be used due to lack of complete data for comparison purposes. Second, the methods for presenting the training material had to be altered following observed outcomes from Group 1 which led to different outcomes with Group 2. It is believed that Group 1 gesture results may have reflected the results seen from Group 2 if the presentation of the fingerplay songs had been identical. Third, the age range of children who participated in the study was older than that initially expected. The study was designed for children 0-2 years of age, in the early stages of language development, to identify any support ASL and gestures may have added to their language development. Many children in the study were over the age of 3 and already had a substantial vocabulary for communication. It is difficult to identify any support ASL or gestures may have provided for this age range. Finally, the natural process of normal language development was occurring simultaneously and would be difficult to identify language changes due to signs or gestures that would not have been attributed to normal development. It is assumed that the ability of the children to use sign for communication shows that an alternative language is being used to improve communication therefore is the result of improved language skills. Because of the threat of maturation a study involving a control group who would receive no treatment could be used to compare the effects of ASL and/or gestures to normally developing children.

### **Future Research**

Further research would be required to identify the extent of ASL or gesture use with young children and its effects on their language development. The small variance found in the preference

between the two conditions allows both conditions to be potential candidates for treatment. Evidence in the effects on language development would allow for a greater support for one over the other. Because the two conditions may serve as treatment options for children who are language delayed or at risk for language disorders, research including a population of children who are disordered. Should one condition be found to support children in a variety of populations, its use as an Early Childhood Intervention tool to support those at risk for language disorders may be used successfully with a larger evidence base.

## SUMMARY AND CONCLUSIONS

The purpose of this study was to compare American Sign Language and Gestural Communication to identify the ability and preference mothers and their children have on using them during the language development ages of the child's life and the extent to which mothers from low SES backgrounds will use signs in the home environment to support and facilitate their child's acquisition of verbal language. The three research questions in the current study included: 1.) Will children from low SES backgrounds use more ASL signs or gestures when exposed to instructional interactions with their mothers, 2.) Will mothers from low SES backgrounds extend the ASL training session into the home environment, and 3.) Which training will be more preferred by the mothers, ASL or gestures?

The hypothesis that by the end of the training sessions, the mothers would have successfully instructed more ASL signs than gestures to their children was supported by the majority of the participants in the groups, with the exception of the 0-2 year old participants in Group 1, which was confounded by the change in methods. The second hypothesis that the mothers will extend the ASL use into the home environment after learning the effects of ASL and gestures on verbal language acquisition had variably results showing that there was more use of ASL in the home environment at 1 and even 3 months post training, but as time increased to 5 months, most aspects of using ASL in the home environment decreased. The results found for the stress levels for using sign in the home were found to be positive, showing that mothers did not find the use of ASL with their children stressful, a predicted factor that was anticipated following work by previous authors. The final hypothesis that the instruction of gestures in the form of fingerplays will prove to be a more preferential condition when compared with the ASL training session was not supported following analysis of both surveys and child behaviors and reactions to the training sessions. It was believed that using gestures in the form of fingerplays would entice children to participate assuming that most children like hearing and participating in song. It was

found that both mothers and children accepted using ASL signs through play interaction and books more.

The importance of this study is that it shows that mothers of low SES are capable of promoting the use of ASL or gestures with their children and are able to extend it into the home environment. Although the data suggests that the use of ASL in the home environment decreases, this trend may be expected secondary to the typical language development that the children are experiencing. As their verbal language skills increase, their use of ASL would typically decrease because by nature children will use the easiest form of communication possible, verbal language. The researcher advocates for teaching mothers from low SES backgrounds to use ASL sign with their children because children from this background are already at risk for language delays and disorders and using ASL to support and facilitate language development may potentially reduce these risks. In addition, education of language development for parents of this population would greatly increase awareness of normal versus delayed/disordered language thus increasing the chances of intervening as early as possible.

## REFERENCES

- Anderson, D. & Reilly, J. (2002). The MacArthur Communicative Development Inventory: Normative data for American Sign Language. *Journal of Deaf Studies and Deaf Education*, 7(2), 83-106.
- Basil, Aaron (2010). *Baby Sign ASL*. <http://www.iDev2.com>. Version 1.04 (iOS 4.0 Tested). July 19, 2010.
- Bradley, R.H., Corwyn, R.F. (2002). Socioeconomic Status and Child Development. *Annual Review Psychology*. 53, 371-399. 2002.
- Capone, N.C. & McGregor, K.K. (2004). Gesture Development: A Review for Clinical and Research Practices. *Journal of Speech, Language, and Hearing Research*. 47, 173-186, February 2004.
- Goodwyn, S.W., Acredolo, L.P., & Brown, C.A. (2000). Impact of symbolic gesturing on early language development. *Journal of Nonverbal Behavior*, 24, 81-103.
- Goodywyn, S.W. & Acredolo, L.P. (1993). Symbolic Gesture Versus Word: Is There a Modality Advantage for Onset of Symbol Use? *Child Development*, 64 (3), 688-701. June 1993.
- Goldin-Meadow (2009). How Gesture Promotes Learning Throughout Childhood. *Child Development Perspectives*. 3 (2), 106-111. 2009.
- Hart & Risley (1995). *Meaningful Differences in the Everyday Experience of young American Children*. Baltimore, MD: Brookes.
- Hoff, E. (2003). The Specificity of Environmental Influence: Socioeconomic Status Affects Early Vocabulary Development Via Maternal Speech. *Child Development*. 74 (5), 1368-1378. September/October 2003.
- Hoff-Ginsberg, E. (1991). Mother-Child Conversation in Different Social Classes and Communicative Settings. *Child Development*. 62, 782-796. 1991.
- Holmes, K.M. & Holmes, D.W. (1980). Signed and Spoken Language Development in a Hearing Child of Hearing Parents. *Sign Language Studies*. 28, 239-254. Fall 1980.
- Howlett, N., Kirk, E., & Pine, K. (2010). Does 'Wanting the Best' Create More Stress? The Link Between Baby Sign Classes and Maternal Anxiety. *Infant Child Development*. 2010.
- Iverson, J.M., Capirci, O., Longobardi, E., & Caselli, M.C. (1999). Gesturing in Mother-Child Interactions. *Cognitive Development*. 14, 57-75. 1999.
- Johnston, J.C., Durieux-Smith, A., & Bloom, K. (2005). Teaching gestural signs to infants to advance child development: A review of the evidence. *First Language*. 25 (2), 235-251. 2005.
- McLoyd, V. (1998). Socioeconomic Disadvantage and Child Development. *American*

*Psychologist*. 53 (2), 185-204. February 1998.

My Smart Hands. <http://mysmarthands.com/Site/i>. April 12, 2010.

Owens, R.E. (2008) *Language Development: An Introduction* (7<sup>th</sup> edition). Geneseo, New York: Pearson Education, Inc.

Ozcaliskan, S., & Goldin-Meadow, S. (2004). Gesture is at the cutting edge of early language development. *Cognition*. 96. 2005.

Pettito, L.A. (1994). Are signed languages “real” languages? Evidence from American Sign Language and Langue des Signes Quebecoise. Reprinted from: Signpost (International Quarterly of the Sign Linguistics Association). V. 7, n.3, 1-10.

Pizer, G., Walters, K., & Meier, R. (2007). Bringing Up Baby with Baby Signs: Language Ideologies and Socialization in Hearing Families. *Sign Language Studies*. 7 (4). 2007.

Rowe, M.L., & Goldin-Meadow, S. (2009). Differences in early gesture explain SES disparities in child vocabulary size at school entry. *National Institutes of Health*. 323(5916). February 13, 2009.

Rowe, M.L., & Goldin-Meadow, S. (2009). Early gesture selectively predicts later language learning. *Developmental Science*. 12, 1, 182-187.

Tellier, M. (2009). The Development of Gesture. *Language development over the lifespan, de Bot*. 1, 191-216. April 27, 2009.

Thompson, R.H., Cothair-Bichelman, N.M., McKerchar, P.M., Tate, T.L., & Dancho, K.A. (2007). Enhancing Early Communication Through Infant Sign Training. *Journal of Applied Behavior Analysis*. 40 (1), 15-23. Spring 2007.

## APPENDIX A

### Examples of Fingerplays in Spanish and English.

#### Tommy Thumb (Spanish)

**El pulgar arriba. El pulgar abajo.  
El pulgar esta alrededor bailando.**

*Hold both thumbs up then hold thumbs down.  
Wiggle both thumbs and rotate in a circular  
motion.*

**Baila en los hombros.**

*Wiggle both thumbs on your shoulders.*

**Baila en la cabeza.**

*Wiggle both thumbs on your head.*

**Baila en las rodillas.**

*Wiggle both thumbs on your knees.*

**Ya se va a dormir.**

*With thumbs up, cross both arms over your chest  
and “cuddle” your thumbs next to your neck/face.*

**2. El indice arriba. El indice abajo.**

*Repeat all gestures with index finger.*

**3. El medio arriba. El medio abajo.**

*Repeat all gestures with middle finger.*

**4. El anular arriba. El anular abajo.**

*Repeat all gestures with ring finger.*

**5. El menique arriba. El menique abajo.**

*Repeat all gestures with pinky finger.*

**6. La familia arriba...**

*Repeat gestures with all fingers in motion.*

**Duermen otra vez**

#### Tommy Thumb (English)

**Tommy Thumb is up and Tommy Thumb is down  
Tommy Thumb is dancing all around the town**

*Hold both thumbs up then hold thumbs down  
Wiggle both thumbs and rotate in a circular  
motion.*

**Dance him on your shoulders,**

*Wiggle both thumbs on your shoulders.*

**Dance him on your head**

*Wiggle both thumbs on your head.*

**Dance him on your knees**

*Wiggle both thumbs on your knees.*

**Then tuck him into bed.**

*With thumbs up, cross both arms over your chest  
and “cuddle” your thumbs next to your neck/face.*

**2. Peter Pointer’s up and Peter Pointer’s down...** *Repeat all gestures with pointer finger.*

**3. Terry Tall is up and Terry Tall is down...**

*Repeat all gestures with middle finger.*

**4. Ruby Ring is up and Ruby Ring is down...**

*Repeat all gestures with ring finger.*

**5. Penny Pinkie’s up and Penny Pinkie’s down...** *Repeat all gestures with pinky finger.*

**6. All the family's up and....**

*Repeat all gestures with all fingers in motion.*

#### Where is Thumbkin?

**Where is Thumbkin? Where is Thumbkin?**

*Hide both hands behind back.*

**Here I am! Here I am!**  
**How are you today, sir?**  
**Very well, I thank you.**  
**Run away, run away.**

*Reveal left thumb, followed by right thumb*  
*Wiggle left thumb as if talking.*  
*Wiggle right thumb as a reply.*  
*Hide left hand behind back, followed by right hand.*

- 2. Where is Pointer? Where is Pointer?** *Use pointer finger to repeat gestures in first verse.*  
**3. Where is Tall man? Where is Tall man?** *Use middle finger to repeat gestures.*  
**4. Where is Ring man? Where is Ring man?** *Use ring finger to repeat gestures.*  
**5. Where is Pinky? Where is Pinky?** *Use pinky finger to repeat gestures.*  
**6. Where is family? Where is family?** *Use all fingers simultaneously to repeat gestures.*

## Mis Cinco Sentidos

**Una boquita para comer,**  
**Mi naricita para oler.**  
**Mis dos ojitos para ver.**  
**Mis dos orejitas para oír,**  
**Mis dos manitas para tocar**  
**¿Y mi cabecita?**  
**Para dormir.**

*(point to mouth)*  
*(point to nose)*  
*(point to eyes)*  
*(point to ears)*  
*(show both hands)*  
*(lean head on both hands, as if to sleep)*  
*(hands and head pretend to sleep)*

## My Five Senses

**A small mouth for eating,**  
**My nose for smelling,**  
**My two eyes for seeing,**  
**My two ears for hearing,**  
**My two hands for touching**  
**And my head?**  
**For sleeping**

*(Point to mouth)*  
*(Point to nose)*  
*(Point to eyes)*  
*(Point to ears)*  
*(Show both hands)*  
*(Lean head on both hands, as if to sleep)*  
*(hands and head pretend to sleep)*

## Abrelas, Cierralas (To the tune of “Open, shut them”)

**Abre tus manos,**  
**Cierra tus manos,**  
**Vamos a aplaudir.**  
**Abre tus manos,**  
**Cierra tus manos,**  
**Muevelas así**  
**Abre tus manos,**  
**Cierra tus manos,**  
**Pósalas aquí.**

*(open both hands)*  
*(close both hands together)*  
*(clap hands together)*  
*(open both hands)*  
*(close both hands together)*  
*(shake both hands in front of you)*  
*(open both hands)*  
*(close both hands)*  
*(place both hands in your lap)*

## “Open, Shut Them”

**Open, shut them,**  
**Open, shut them,**

*(Open and close hands into a fist)*

**Give a little clap, clap, clap**  
**Open, shut them,**  
**Open, shut them,**  
**Put them in your lap, lap, lap.**  
**Creep them, creep them**

*(Clap hands)*

*(Open and close hands)*

*(Place both hands in lap)*

*Starting at the tummy, slowly 'creep' fingers up toward the face.)*

**Slowly creep them.**

**Right up to your chin**

*(place all fingertips on chin)*

**Open up your mouth**  
**But do not let them in.**

*(open your mouth)*

*(Just as it looks like you're going to put fingers into mouth, quickly run fingers back down body toward tummy.)*

## APPENDIX B

### First ASL signs based on MacArthur Communicative Development Inventory:

Daddy	Diaper
Mommy	Grandma
Bye	Rabbit
Ball	Clap
Baby	Finish/all done
No	Cow
Shoe	Hat
Milk	Horse
Cookie	Book
Cat	Duck
Dog	Cry
More	Bath/wash
Eat/Food	Fish
Drink	Tree
Bird	Kiss
Cracker	Sleep
Banana	Rain

#### ADDITIONAL SIGNS CHOSEN FOR STUDY:

Water  
Potty  
Blanket/cold  
Pacifier  
Toy  
Bubbles  
Love  
Clean  
Body parts...  
Hurt/pain  
Clothes  
Pajamas (sleep clothes)  
Lotion/cream  
Outside  
Sun  
Moon  
Morning  
Night

## CURRICULUM VITA

Vanessa Arreola was born and raised in El Paso, TX where she attended and graduated as a member of National Honor Society and Mu Alpha Theta from Maxine Silva Health Magnet High School. She obtained a Bachelors of Science majoring in Microbiology with a minor in Chemistry from the University of Texas at El Paso. Upon completion of degree, Vanessa moved to Austin, TX where she lived for two years and had a beautiful daughter. In addition to college, Vanessa also worked full time as a Certified Pharmacy Technician at Walgreens from July 2001 until July 2010. Three years following college graduation, Vanessa sought a graduate degree and became interested in the field of Speech Language Pathology. She was accepted to the graduate program in August 2010 and is anticipated to graduate with a Master's of Science in Speech-Language Pathology in May 2012. During the course of the program, Vanessa has attended the ASHA national conference in November 2011 as well as the TSHA state conference in March 2012 where she also presented a poster on the topic of this study. She has received the Scholarship for Disadvantaged Students (SDS) Award in 2011 and 2012 as well as the Dr. Grace Middleton Endowed Scholarship via the El Paso Speech-Language and Hearing Association in 2012. In addition, Vanessa has been an active member of the UTEP chapter of the National Student Speech Language and Hearing Association since 2010 and was elected External Vice President during the 2011-2012 school year.

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