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Does Baby Sign open the door to second language learning?

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DOES BABY SIGN OPEN THE DOOR TO SECOND LANGAUGE LEARNING?

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Infancy is a critical period of development for a child. In addition to the physical growth and development of motor skills that takes place, infancy is the period of a child's life in which the foundation for future language development is laid. Speech-Language Pathologists, parents and other professionals who work with children consider infancy a crucial period for child development. The professionals in the field of Speech-Language Pathology are interested in and concerned with factors that might either enhance or detract from an infant's language development. Baby Sign, a method of augmentative communication used by and with pre-verbal infants, allows infants to express their needs and interests before they are able to speak. There is considerable interest in whether or not Baby Sign is advantageous for language development. Some debate exists between popular literature, marketing claims and academic research about the benefits of Baby Sign beyond pre-verbal communication (Doherty-Sneddon, 2008).

The purpose of this thesis project is to determine the relationship between an infant's acquisition of Baby Sign and their ability to acquire a second language later in life. An explanation of why infancy is a critical time for language development will be presented and information about the impact of Baby Sign on an infant's development will be provided. There are many research and popular claims regarding Baby Sign that will be discussed, in addition to research findings concerning second language learning. Based on this research, conclusions about the connection between Baby Sign and second language learning will be drawn and suggestions for future research will be provided. The expectation of this thesis project is that a positive correlation between the use of Baby Sign and later second language learning will be established.

Infancy and Language Development

Brain and Nervous System

When a child is born, the brain is extremely different than it will be when the child reaches adulthood. Babies are born with a brain that is thoroughly undeveloped compared to the adult brain (Marks, 2002). This allows an infant's brain to grow and develop outside of the womb, so that the child can learn from the environment in which they live and develop skills suitable to their environment. When an infant is born, his or her brain only weighs 25% of what an adult brain weighs. Throughout the first year of life, the brain will become larger and heavier (Dekaban & Sadowsky, 1978). The auditory cortex, as well as other sensory related areas of the brain, also go through a great deal of growth and development during infancy (Maurer, 2005; Pascallis, de Hann, & Nelson, 2002).

Vocal Tract

The infant vocal tract and the adult vocal tract are also noticeably different. An infant's vocal tract is about seven or eight centimeters in length, whereas the adult vocal tract is about fifteen to eighteen centimeters. The infant larynx is also positioned much higher in the throat than the adult larynx. This elevated larynx position during infancy is a protection mechanism against choking. The larynx gradually descends toward adult position as the child matures (Vorperian, et al., 2009).

Speech Perception

Speech perception is an infant's ability to hear and perceive all sounds, or consonants and vowels, that humans are capable of producing. There are about 600 consonants and 200 vowels that make up all of the languages in the world. Each world language uses only a fraction of the sounds that humans are capable of producing, but infants are born capable of perceiving all sounds humans can produce (Kuhl, 2004, 2007; Vihman, 1996; Werker & Polka, 1993).

One area of perceptual development that takes place during infancy deals with intonation. Intonation is the contour of speech. It is the melody of an individual's vocal productions, not the individual speech sounds or words in the sentence Despite that intonation does not refer to speech sounds or words, the contour of speech provides meaning. Infants are capable of differentiating between various intonation patterns shortly after birth (Mehler, Bertoncini, & Barriere, 1978). At around six months of age, infants are capable of understanding the meaning behind intonation. If a parent said "no" to their child in an authoritative tone, a six month old child would cease his or her behavior at the time the command was given, because he or she would be able to understand the meaning of the tone that the word was spoken in even if the word itself was not understood (Hedrick, Prather and Tobin, 1984).

Additionally, perceptual development in infancy leads the child to the understanding that within connected speech there are individual speech sounds. Infants are capable of this extremely complex task due to the human hearing system's ability to perceive categorically, which is the ability to divide speech into its individual speech units, or speech sounds (Jusczyk, 1992; Eimas, Siqueland, Jusczyk, &Vigorito, 1971). From birth on, an infant is able to perceive speech sounds. At the beginning of all infants' lives, they are able to differentiate between speech sounds of other languages as easily as they are able to differentiate between speech sounds of their native or primary language. However, as the infant grows and learns from the environment that they live in, they begin to focus on the speech sounds of the language that they have been exposed to most frequently. By the age of one, a child is better able to perceive the sounds of his or her language than of other languages (Stark, 1980).

Vocal Production

Vocal production, or the production of sound for speech, develops through four stages in infancy. The first stage, during the first few months of infancy, is marked by the infant producing vegetative sounds. Vegetative sounds are produced as an infant inhales and exhales, while moving the jaw and tongue. Cooing is the next stage and occurs when the child is about three to four months old. Cooing includes sounds that are produced at the back of the mouth, and include sounds that resemble /k/ and /g/. An infant's vocalizations begin to move toward the front of the mouth at around four or five months of age. This is considered Vocal Play and includes sounds that resemble /b/ and /d/ (Stark, 1980).

Babbling, the fourth (and often considered the most important) stage of infant vocal production development, is typically established around seven to eight months of age (Stark, 1980). Babbling is technically considered vocalizations in which twenty percent of sounds produced contain a consonant and vowel within the same syllable. Examples of utterances that would be considered babbling include "da da" and "ga ga". A child's ability to babble is the sign of significant progress with language development. Babbling indicates that a child is able to put a consonant with a vowel, or create a syllable. Because syllables are the foundation of language, this is a very important milestone. Additionally, infants' babbling increasingly includes sounds of their native language. Babbling the sounds of their native language prepares infants to use the spoken words of their language in the near future (Boysson-Bardies &Vihman, 1996).

Connecting Perception and Production of Speech Sounds

During infancy, children begin to develop an understanding of the connection between the production and perception of speech sounds. An infant establishes this link by listening to his or her parents' or other caregivers' speech. Additionally, when an infant vocalizes and then hears

these vocalizations, the infant makes the connection between what is being produced with the mouth and what is heard through the ear. When infants vocalize, they learn that the way they shape their articulators and push air through their oral or nasal tract affects the noise that they make and then hear (Goldstein & Schwade, 2008).

There is a definite lag between an infant's perceptual abilities and their productive abilities. The auditory cortex, which is responsible for interpreting incoming auditory information, reaches maturity before the period of infancy is over. This means that by the time a child is a year old, they have mature perceptual abilities (Maurer, 2005; Pascallis, de Hann, & Nelson, 2002).

Infant Communication

Infancy can be considered a time during which the basic skills needed for future communication are developed. There are two major communication developments in infancy. First, an infant learns that sound carries meaning. Categorical perception allows infants to understand that when other people make sounds, those sounds have meaning (Chang & Thompson, 2011; Jucszyk, 1992). Second, infants learn that conversations have a back and forth pattern (Bruner, 1983). Infants gain an understanding that conversations are essentially the passing of sound back and forth between at least two people (Fillmore, 1975).

Parents, caregivers and the environment that they provide for a child are critical to language development. Adult speech that is modified to enable language learning for a child focuses on what the child is paying attention to or interested in at any point in the conversation, keeps the child interested and is tailored to the child's developmental stage and knowledge base (Goldstein & Schwade, 2008; Kuhl, 2004, 2007; Gleitman, Newport & Gleitman, 1984).

A social context is also extremely important for infant language learning. In order for language learning to be successful, infants must have interactive encounters with adult speech. It is not enough for children to be simply exposed to speech in their environment or in front of the television. Children need to engage in "conversations" with adults, in which their vocalizations and shifts in attention are responded to and actively encouraged (Goldstein & Schwade, 2008).

Significant Speech Milestones Achieved in Infancy

Children achieve a number of significant developmental milestones during the first twelve months of their lives. Infants develop skills for understanding language, vocalizing and communicating; all of which are important foundations for future speech and language development. Below is a table that lists the major milestones that infants reach at certain ages between birth and twelve months and categorizes the type of milestone. (These ages are to be considered approximate ages for each milestone to be reached.) The milestones listed in Table 1 are categorized as milestones that pertain to either communicating, understanding or vocalizing.

Table 1: Infant Speech and Language Milestones

Age in Months	Communicating	Understanding	Vocalizing
0			*Vegetative sounds*
1			*Vegetative sounds*
2			*Vegetative sounds*

3	*Might vocalize when spoken to*		Might imitate the intonation contour of the parent or caregiver *Cooing is established*
4	*Might vocalize when spoken to*	Responds to name	*Cooing is established* Vocalizations are mostly sounds produced at the front of the mouth
5	Takes turns with sounds *Likes sounds accompanied by gestures games (like peek-a-boo*	Responds to no (with inflection)	
6	*Likes sounds accompanied by gestures games (like peek-a-boo)* Might produce idiosyncratic words (like "baba" for bottle)	Responds to no (with inflection) Moves to/looks at family member when the person is named	
7		Moves to/looks at family member when the person is named	*Babbling is established*
8		Responds to "come up" *Responds to no (WITH inflection)*	*Babbling is established*
9	Participates in speech routine games ("pat-a-cake")	*Responds to no (WITH inflection)* *Follows simple commands that are accompanied by gestures*	
10	Initiates sound-gestures games ("peek-a-boo") Uses intentional, habitual gestures and short sounds to get what is wanted	*Follows basic commands that are accompanied by gestures*	
11	Can cover own face when playing "peek-a-boo" *Speaks first word*		
12	*Speaks first word*		

Milestones that are listed in more than one month and italicized range in age of acquisition across the months that they are listed in.

Information in table is derived from: Gartier & Devouche (2011); Goldstein &Schwade (2008); Jusczyk (1992); Hedrick, Prather, & Tobin, (1984); Oller (1992); Stark (1980).

Popular Literature Pertaining to Baby Sign

Infancy is obviously an important time in a child's development. Additionally, it is a very important time for parents, who typically realize how critical infancy is to a child's future development. Baby Sign Language, or Baby Sign, is a popular method of teaching infants to effectively communicate their needs to their parents and caregivers (Williams, 1999). In addition to being a tool for communication, there are many claims about other academic, social, emotional and developmental benefits that accompany the use of Baby Sign with an infant. There is a wealth of information about Baby Sign readily available on the internet, much of it specifically aimed at persuading parents and caregivers to make the decision to use Baby Sign with their child and then provide them with resources to help them incorporate Baby Sign into their (and their child's) routine. The following sections are reviews of the information provided by three Baby Sign websites that are easily accessible to parents and consumers via an online search engine.

Babies and Sign Language

One website, Babies and Sign Language, described Baby Sign as "a method in which you and your infant (or toddler) use specific handshapes and motions to convey words and meaning (quickly and easily) with each other". The claim made on the website's homepage was that Baby Sign helps reduce an infant's frustration with his or her inability to communicate vocally and decreases the parents' and caregivers' frustration with their inability to determine what the child needs based on their cries and tantrums (Williams, 1999).

In addition to the claim that Baby Sign reduces the frustration that the inability to communicate can lead to for an infant and caregiver, the website also included a list of benefits that Baby Sign provides. Some of those listed benefits were: promotion of language skill development, reinforcement of previously developed language skills, increased speed of development of spatial reasoning skills, potentially increased IQ, increased creative thinking and increased early literacy skills. The author claimed that Baby Sign helps infants to feel satisfied and accomplished. It was also stated that Baby Sign teaches infants how to start and participate in a conversation. Furthermore, the list of benefits included the statement "Teaches a 2nd language that is formally and nationally recognized [American Sign Language]" (Williams, 1999).

The author of Babies and Sign Language also wrote that parents should begin signing with their infants as soon as the baby can maintain eye contact and attention. It was also recommended that parents wait to begin teaching sign until the parent or caregiver that is teaching Baby Sign is able to keep the infant's attention for at least seven to ten seconds at a time. The author stated that some researchers believe that parents can, and should, begin using Baby Sign with their infants between the ages of two weeks and two months. However, the author also stressed that no matter when Baby Sign is introduced, or how enthusiastically it is implemented, parents should not expect to see their infant using signs until the child reaches five or six months of age (Williams, 1999).

The author also presented the other side of the benefits of Baby Sign. The author mentioned that there are positive aspects for parents, caregivers and other adults who interact with infants who use Baby Sign. Anyone who would have regular contact with an infant who uses Baby Sign could potentially benefit from being able to get a basic understanding of why the

infant is crying or whining. The author also adds that an infant might be able to communicate their feelings or needs to a nurse or doctor in the event that they are hospitalized (Williams, 1999).

Babies and Sign Language included a variety of additional pages pertaining to multiple subjects within the field of Baby Sign. The author provided information about how a wide range of adults who frequently interact with an infant can use Baby Sign to their advantage. There were different pages with information about using Baby Sign effectively and reaping its benefits for grandparents, daycare providers and teachers (Williams, 1999). There were also pages with information that pertained to parents of children with special needs. The author claimed that Baby Sign can improve language and communication skills for children with apraxia, autism, cerebral palsy, Down Syndrome, mental or communicative impairments, learning delays, language learning disabilities (LLDs), deafness, hearing impairments and medical issues that result in communication problems; an example being a tracheotomy (Williams, 1999).

Additionally, the author also provided parents with information about how to deal with other adults who are not interested in contributing to using Baby Sign with their child or have skeptical or critical attitudes towards Baby Sign in general. The main critical comment that the author warned parents that they might hear is that Baby Sign will prevent the child from learning to speak or delay the onset of spoken language. The author wrote that this statement is false and then provided a list of suggested statements to use when sharing evidence that using Baby Sign is not harmful, but rather very beneficial. The list includes statements like:

- Baby Sign helps babies to develop earlier than babies who do not learn Baby Sign. For instance, the parts of the brain related to language, motor and

coordination skills and vocabulary develop faster and earlier for babies who are taught Baby Sign.

- Infants who are taught Baby Sign are typically more interested in books, develop recall skills that help them to become better students when they begin school and often develop higher IQs.
- Gesturing is a natural form of infant communication whether or not the infant uses Baby Sign, but using Baby Sign allows infants to communicate their needs so that they will cry and throw tantrums less.
- Baby Sign teaches infants about symbols and the role of symbols in communication. It allows and encourages infants to communicate about their thoughts, feelings and interests.

List derived from information provided by Williams (1999).

Baby Sign Language

Another online resource that parents could easily access through an internet search engine is Baby Sign Language. Baby Sign Language is a website that provides parents with information and access to resources that help parents begin using Baby Sign with their infants and incorporate it into their families' lives. This website also had a page that parents could use to purchase Baby Sign Language products like teaching guides, posters and flashcards. Baby Sign Language, the company that maintains this website, also sells Baby Sign Apps for a few different types of smart phones.

The authors of Baby Sign Language appear to be slightly more conservative with the claims that they make about the benefits of Baby Sign than the author of Babies and Sign Language was. First, the authors of Baby Sign Language mention that Baby Sign not only allows

parents to gain some insight into what their infant is thinking or needing, but that "research" indicates that parents and infants that use Baby Sign have closer bonds than parents and infants that do not. The authors also advocate that the most important component of Baby Sign is having fun and enjoying the time the spent bonding with the child, even saying "Baby Sign Language is above all a fun way to bond with your baby" (Retnasaba, Parker, Lau & Weaver, n.d.)

Next, the authors mentioned that infants who use Baby Sign are less fussy and have fewer temper tantrums because they can effectively communicate what they want and have their needs met more quickly and accurately. The authors expanded on that idea, stating that parents whose children tantrum and cry less have more positive feelings about their child (Retnasaba, Parker, Lau & Weaver, n.d.).

Lastly, the authors mentioned that Baby Sign promotes mental development and accelerated vocabulary development. They also explained that some research shows that eight year old children who had learned Baby Sign as infants had, on average, IQs that were twelve points higher than children who had not learned Baby Sign (Retnasaba, Parker, Lau & Weaver, n.d.).

Sign2Me

A third website, Sign2Me, provides parents with information about resources (like classes) to help them with teaching Baby Sign to their infants. Parents can also purchase products like books, CDs and flashcards to help them teach their infants to use Baby Sign. Sign2Me is a company that offers a Baby Sign Language program that is based on, American Sign Language. The company also develops products that are intended to enhance learning for infants using Baby Sign (Baby Sign, n.d.).

There was also a webpage dedicated to explaining the benefits of Baby Sign. A few of the listed benefits were similar to Baby Sign Language's list. For instance, the authors of Sign2Me also claimed that Baby Sign enhances early language skills and reduces the amount of time that infants spend crying or fussing because their caregivers are unable to understand what it is that they want. Additionally, the authors claimed that infants feel empowered by their ability to communicate with others around them. This feeling of empowerment then significantly impacts their feelings of happiness (Baby Sign, n.d.).

Based on the information provided by the three websites that were reviewed in this study, it appears that parents are presented with a lot of different ideas about how Baby Sign can benefit their children. Three main themes that surfaced from the popular literature were the emotional, developmental and "bilingual" benefits of Baby Sign. Concerning emotional benefits, popular literature claims that Baby Sign raises infants' self-esteem and helps them to feel more confident and happy. Parents might also read that parents of infants who use Baby Sign (and subsequently tantrum less) have more positive feelings about their children. Claims are made that Baby Sign enhances a child's linguistic and academic development, as well. Lastly, there are claims that teaching an infant Baby Sign makes the child bilingual.

Research Literature

Academic research and scientific studies are necessary to help determine whether the popular claims about Baby Sign have merit. The aforementioned popular literature could be considered biased; two of the websites were written in the attempt to encourage the use of Baby Sign and advertise Baby Sign products for sale. The other website was written by a parent who used Baby Sign with her child and created the website to encourage and support other parents

who use Baby Sign, or are trying to decide whether or not to use it, with their children. Surveying research literature about Baby Sign provides information that is much less biased and includes more conservative claims about the benefits of using Baby Sign with infants. The information collected through academic literature is also more reliable because the research conducted regarding Baby Sign is typically acquired in an attempt to determine the potential benefits or concerns for language development, not promotion of specific beliefs or products. The review of research literature for this thesis project focused on the emotional and linguistic development resulting from the use of Baby Sign. Additionally, the idea of Baby Sign being a second language and the topic of second language learning in general were explored.

Emotions

As mentioned previously, one of the benefits that popular research touts about Baby Sign is that it offers infants a form of communication that allows them to explicitly express what it is that they want or need, so that they do not need to cry or throw tantrums to indicate that they want something. The authors of Baby Sign Language also claimed that parents of children who use Baby Sign (and as a result cry and tantrum less) have more positive feelings about their children (Retnasaba, Parker, Lau & Weaver, n.d.). Research literature also indicated that even though crying serves as developmentally normal method of communicating needs for infants, parents typically have unfavorable feelings about their crying (Brewster, Nelson, McCane, Lucas, & Milner, 1998; Donovan, 1981; Frodi & Lamb, 1980). This leads to the conclusion that parents and caregivers might have a preference for, or more positive feelings about, their infant using Baby Sign to communicate their desires and basic needs (Thompson et al., 2007).

A study by Pizer, Walters and Meier also concluded that even though many marketing claims about Baby Sign programs are generally not well supported by scientific studies, many

parents feel positive about their decision to use Baby Sign with their child. Their positive feelings might stem from their belief that their use of Baby Sign with their infant improved early communication within their families (2007).

As was mentioned previously, popular research indicated that Baby Signs helps babies to feel more empowered and happier than they would have without being able to communicate with Baby Sign. However, scientific research has not yet been able to support the claim that Baby Sign improves infant self-esteem (Pizer, Walters & Meier, 2007).

Language Development

Scientific literature indicated that there are developmental advantages to teaching typically developing infants to use Baby Sign. Studies concerning infant language development after exposure to Baby Sign indicated that infants who were taught Baby Sign acquire their first signs at an earlier age than infants typically develop their first spoken words (Bonvillian, Orlansky, Novack, 1983). In Bonvillian, Orlansky and Novack's study, eleven hearing children born to deaf parents produced their first recognizable signs at an average age of eight and a half months of age (1983). Typically developing children, on average, produce their first spoken word between eleven and twelve months of age.

One of the concerns that some people have is that Baby Sign might actually hinder or delay the onset of vocal language production, rather than facilitate language development. Popular literature disputed this claim and research literature tended to as well. In one study, hearing infants whose parents encouraged the infant to use symbolic gestures with them performed better on tests pertaining to receptive and expressive language than did children whose parents only encouraged them to use vocal language (Goodwyn, Acredolo and Brown, 2000).

Bilingualism

While in many cases Baby Sign is based on or related to American Sign Language (ASL), the two are not synonymous. Despite its lack of spoken words and unique system of using hand signing to convey meaning, ASL is considered a true natural language. American Sign Language has rules for producing grammatically correct syntactical, phonological and morphological structures (Stokoe, 1960). In addition, ASL has a complex structure and grammatical system, which are both fundamental properties that all other languages exhibit (Kilma & Belugi, 1979).

Baby Sign is, by academic standards, considered an augmentative communication tool that is intended for use with infants who are not verbal. Baby Sign involves teaching infants important and frequently used word signs that they can use to communicate before they are able to talk (Doherty-Sneddon, 2008). Even when infants are being taught Baby Sign that is based on American Sign Language, they are only being presented with signs for words for specific items or needs that they frequently communicate. Simply learning words or signs is not learning a language. As mentioned previously, a true language involves grammatical structure, syntax and other more complex aspects of language that Baby Sign does not possess.

Bilingual ability is considered the ability of an individual to use the second language he or she acquires for comprehensible expressive and receptive communication (Daniels, 2003). In other words, bilingualism is an individual's capacity to use both languages for thorough expression of ideas and understanding others. Because Baby Sign cannot be considered a true language, a child who uses, for example, both English and Baby Sign for communication cannot be considered bilingual. Furthermore, a child would not be able to organize complete,

grammatically correct sentences with only the ability to sign the words for various objects or ideas, no matter how large their signing vocabulary from Baby Sign.

Second Language Learning

Acquiring and effectively using a second language is an important skill, especially as societies, education systems and economies around the world are becoming increasingly interconnected. An environment that is stimulating and linguistically rich is conducive to second language learning. The amount of time and energy parents put into communication with their children is a strong predictor of how quickly a child will be able to expand their language learning (Clark, 2000). Aptitude, or language learning ability, is also considered in an important factor in a person's rate of development of a second language. It is believed that second language learning aptitude is related to cognitive factors (Dale, Harlaar, Haworth & Plomin, 2010).

In addition to second language learning aptitude, there are theories about the importance of the family and home environment in relation to success in second language learning. A study by Gardner (1968) reaffirmed the idea that aptitude for second language learning is related to success in achievement of the second language. In addition, Gardner (1968) concluded that attitude and motivation towards the second language are important factors in achievement of second language acquisition. Children who are eager to communicate within the community or group of people that speak the language they are attempting to learn, have positive attitudes towards the second language itself and the community that uses the language tend to be more motivated to learn the second language and more successful in actually doing so. Lambert and Klineberg's (1967) study also indicated that children's attitudes towards to other cultural groups who speak other languages are often a reflection of their parents' attitudes towards other cultural groups and speakers of other languages.

To summarize, the conclusion that acquiring a second language is nurtured by internal motivation and attitude is supported. Furthermore, developing a positive attitude towards a second language is "dependent upon a particular attitudinal atmosphere in the home" (Gardner, 1968).

There is also evidence to suggest that bilingualism (proficient understanding and use of two languages) has a positive effect on a person's ability to acquire a third language. While there are many factors and variables that influence language learning in general, research has supported the "folk idea" that additional languages are more easily acquired by people who are already proficient in more than one language than monolingual individuals. There is a positive relationship between bilingualism and additional language learning given that the third language learning occurs in additive contexts and that the individual has achieved literacy skills in their first and second languages. This relationship can be attributed to the fact that bilingual individuals have a wider linguistic basis than monolinguals that can be used to their advantage when acquiring a third language (Cenoz, 2003).

Conclusion

Summary

The purpose of this thesis project was to answer the question of whether or not using Baby Sign with an infant better prepares that infant to acquire a second language in the future than an infant who had not been exposed to Baby Sign. The predicted result of this thesis was that a positive correlation between infant exposure to Baby Sign and future second language acquisition would be established, but that a definitive conclusion would not be possible due to the complex nature of language acquisition and the large number of factors that impact the process.

Because infancy is known to be a critical time for language development in which the foundations for communication are established, there is considerable interest in whether or not Baby Sign is beneficial or detrimental to infant language development. Interest in Baby Sign among consumers, parents and professionals led to the review of both popular and scientific literature for this thesis project.

Popular literature overwhelmingly supports the use of Baby Sign for communication with preverbal infants. The popular literature surveyed in this study made claims about the benefits of Baby Sign that range from increased IQ level to heightened infant self esteem to enhanced bonds between infants and parents or caregivers. Some of the sources of popular literature mention that using Baby Sign with an infant is teaching them a second language. The major claim that popular literature asserts is that using Baby Sign with an infant is very beneficial, and not at all harmful, to an infant's language development.

Research literature is much more conservative regarding the potential benefits of Baby Sign. Scientific studies have determined that enhanced communication between preverbal infants and their parents as a result of Baby Sign can lead to parents having more positive feelings about their infants. The idea that Baby Sign does not detract from language development is also supported by academic literature. However, research is not yet able to support the idea that using Baby Sign enhances an infant's self-esteem. Additionally, research literature does not support the claim that using Baby Sign with an infant is teaching them a second language because Baby Sign does not meet the qualifications to be considered a true language.

Finally, this thesis project included a literature review of studies pertaining to second language acquisition. Research indicates that language learning aptitude and the time and energy that parents put into communicating with their infants are both important factors in a child's

ability to acquire a second language. Parents who use Baby Sign with their children are investing time into communicating with their children, which indicates that they will probably continue to invest time and energy into communicating with their children and help promote their children's language development. Both the child's and parents' attitudes toward the child acquiring the second language they are learning and the ethnic or cultural group that use the language have been found to play a role in the child's success with second language learning. It is assumed that parents who choose or chose to use Baby Sign have positive attitudes about forms of communication other than their native language, which may indicate that these parents would have positive attitudes about the second language their child is learning or will learn. Lastly, there is evidence that indicates that bilinguals are able to acquire additional languages more easily than monolinguals. This can be attributed to bilinguals possessing a more expansive linguistic base than monolinguals. However, children who use Baby Sign are not considered bilingual like children who fluently use American Sign Language are.

Limitations

This thesis project was limited in a few ways. First, parents and families can teach and use Baby Sign however they wish. Because two infants were both exposed to Baby Sign does not mean that they had similar experiences with it. One infant might have been taught and used a large number of signs on a regular basis while the other infant might have been taught a few signs and only encouraged to use them on occasion. Therefore, the conclusions drawn in this study might not be universally applicable to all infants who were exposed to Baby Sign. The benefits of Baby Sign are more likely applicable to children who used it with their parents and primary caregivers more frequently and actively during infancy.

Additionally, this thesis project was focused on adults and infants whose primary or native language is English. The potential exists that a different primary or native language might result in different findings. It is also possible that the conclusions of this study cannot be generalized to parents and infants whose primary language is a language other than English.

Lastly, there are constantly new studies being performed and new information resulting from them. It is almost certain that future studies will uncover more information about infancy, language development, Baby Sign and second language learning. New information might lead to different conclusions or more definite conclusions about the relationship between Baby Sign and second language learning. Furthermore, this thesis project was a literature review of a relatively small sample of sources. A study that is able to analyze a larger number sources of information and provide a more comprehensive review of literature pertaining to infancy, language development, Baby Sign and second language learning might be able to make more conclusive claims about the connection between Baby Sign and second language learning.

Suggestions for Future Research

Future research can and needs to be done to help determine whether or not there is a causal relationship between Baby Sign and success with second language learning or if Baby Sign is simply a factor that helps to create a linguistically rich environment that will help promote success with second language learning. If there were to be a study performed with the goal of obtaining the answer to this question, my recommendation would be a longitudinal study that follows a large sample of children from infancy to graduation from high school. The study could be set up so that about half of the children would be a part of families in which parents chose to use Baby Sign in infancy and the remaining children would be a part of families in which parents had chosen to not use Baby Sign. Each child's progress and success with second

language learning throughout their childhood and adolescence would be monitored and recorded. Parental education, familial socioeconomic status, the child's health and medical considerations, the quality of education the child received and other factors could be considered during the analysis of the results of the study.

Discussion

Based on the findings of this literature review, there are a few conclusions that can be drawn with confidence. First, infancy is an extremely important time period during which the base for future language development is constructed. Second, popular literature and research literature concerning Baby Sign agree that Baby Sign is not detrimental to an infant's language development. Furthermore, research literature is more conservative than popular literature when claiming that Baby Sign can be beneficial for infant language development, but it appears that Baby Sign positively impacts language development due to the increased interaction and bonding between parents and infants who use Baby Sign. Baby Sign can be considered a positive factor in promoting an environment that is stimulating and supportive of infant language development.

The specific question of whether or not an infant's exposure to Baby Sign improves his or her ability to acquire a second language is less definitively answered. Clark (2000) explained that a stimulating, linguistically rich environment in which parents devote time and energy to their child's communication skills is conducive to a child's second language acquisition. It would seem that parents that are willing to learn Baby Sign and put effort into teaching it to their infant are probably providing stimulating, linguistically rich environments in other ways. These parents might also be the type of parents that would continue to put effort into providing an environment that would help facilitate a child's language development and their acquisition of a second language. This reasoning does not establish a direct causal relationship between an infant's use

of Baby Sign and second language acquisition but it illustrates how Baby Sign might be connected to second language learning.

Both a child and their parents' attitude and motivation toward second language learning and the speakers of that language are important factors in a child's success with acquiring a second language. Positive attitudes towards the second language and the group of people who speak that language lead to increased motivation to successfully acquire the second language (Lambert & Klineberg, 1967; Gardner, 1968). If a child had used Baby Sign in infancy or early childhood, he or she might feel comfortable with or positive about using forms of communication other than his or her native language, potentially increasing the child's motivation to successfully acquire a second language. Additionally, parents who choose to use Baby Sign with their child might have more open minded and positive views about forms of communication or languages other than their native languages which would, in turn, increase their child's motivation in acquiring a second language.

Baby Sign cannot be considered a language, so teaching an infant to communicate with Baby Sign does not make him or her bilingual. As stated by Cenoz (2003), bilinguals have an advantage over monolinguals in acquiring additional languages. Since infants who use or used Baby Sign are not bilingual individuals, they probably would not have an advantage in learning an additional language over other monolingual individuals who were never exposed to Baby Sign. However, if parents use Baby Sign with their infants as a method of introducing American Sign Language (a true and complete language) in addition to their native spoken language, the benefits of bilingualism in acquiring an additional language would, theoretically, apply to those infants.

In summary, it seems that the most likely answer to the question of the impact Baby Sign can have on second language learning is correlative. Research supports the popular claim that Baby Sign is beneficial to infant language development. However, research cannot yet provide concrete evidence that Baby Sign directly impacts a child's ability to acquire a second language. It appears that Baby Sign, as a component of a stimulating environment that promotes language development and communication between a parent and child, could be correlated with a child's future success in acquiring an additional language.

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