Clear Communication:

Signing and Its Implications for Children with Special Needs

An Honors Thesis for the Eliot Pearson Department of Child Development

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Table of Contents

Abstract

It has been generally accepted that children with verbal language delays in early childhood are often at risk for difficulties in social and emotional domains. In an attempt to lessen the potential long-term impact of these early delays, broad-ranging accommodations and supports have been developed and integrated with varying degrees of success. Although there has been some research into the potential benefits of using sign as a supplementary language support, it is extremely limited. This study sought to explore the possible developmental implications of the use of sign with children with special needs who were already using sign as a means of support. Children identified as using sign were observed in both classroom and camp settings, and the

contexts, situations and nature of their uses of sign were recorded. In order to obtain a more complete understanding of the nuanced and complex functions of signing within these contexts, many of the students' parents and teachers participated in semi-structured interviews, describing their experiences with sign and the ways in which the use of sign took shape in the classroom or home. The results of these observations and interviews suggest that the use of sign as a supplementary language support has implications for the emotional development and the development of self-regulation in the children taking advantage of these accommodations. Although the incorporation of sign in addition to more typical verbal language supports requires sustained adult effort for its successful integration, this investment seems to help provide a sense of trust and security between the child and caregiver. Trust and security seem to help initiate and promote increased communication, socialization and overall adaptation for these children

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Introduction

Project Beginnings

As an employee at the Tufts Educational Day Care Center (TEDCC), the researcher (described in the subsequent researcher background section) was exposed to sign-based language supports as a freshmen work-study student. One of the children in her assigned classroom, subsequently referred to as "Carlos," used signs the signs for "more" and "all done" to indicate his interest in a particular activity, food item, etc. Although she had little previous exposure to sign, she was intrigued by the unique way in which it allowed this otherwise nonverbal child to communicate.

Although her first interactions with Carlos were limited due to the restraints of her time in the classroom and Carlos's support from a one-to-one facilitator, she began to recognize and use many of his signs. As her involvement with TEDCC continued over the next year, she witnessed the child grow from being completely non-verbal to combining signs and word approximations. Although no definite attribute to his increased verbal abilities could be established from his use of signs, a relationship between the two was suspected.

At the end of the school year, the researcher's role within TEDCC changed from that of part-time teaching assistant to that of full-time summer teacher. Part of her responsibilities as a summer teacher included working with Carlos as a one-to-one facilitator. Because she had some basic coursework in American Sign Language and was familiar with Carlos and his use of signs, she quickly and easily began relying on them as an effective aid for communication. This ease of communication contrasted with the experiences of the other summer teachers, as they as often did not have as effective means of communication with Carlos.

Through her interactions with Carlos, the researcher noted the specific ways in which he was using the signs. Oftentimes, he would combine signs with spoken word approximations, allowing better comprehension of his speech. In addition to augmenting his expressive language capacities, they also seemed to enhance his receptive capabilities. When given a direction coupled with a sign, Carlos would respond to the direction more consistently than when simply given a verbal direction alone. Beyond these interactions with teachers, signs also seemed to be an integral component of his social interactions as well. She noted that Carlos's peers would not only approach him using signs instead of words, but also respond to his signed approaches as well.

Because sign seemed to be an integral part of this child's use of language and social interactions, it seemed logical that his use of sign corresponded to his progression in these domains. Although it certainly seemed to have an impact in his progression, could the positive outcomes be attributed solely to Carlos's use of sign? Furthermore, was his situation unique? Or could signing have the potential to help other children within these domains? Carlos's classroom environment integrated formal sign instruction to all children and promoted his use of sign to interact with both teachers and peers. This classroom familiarity with and encouragement of sign is somewhat anomalous as there is little commitment and familiarity with sign amongst the general population. Would children in similar contexts with needs in similar areas also experience such effects? What about children in different contexts? What are the potential roles of sign in an inclusive classroom environment? These initial observations and questions led to the overall development of this project.

Rationale

The ability to communicate is almost essential for functioning in today's society. Humans rely on communication to meet basic survival needs, form connections with other people and

maintain emotional and mental homeostasis. Although with the advent of new technology, the nature in which humans communicate has changed, limiting, at least to some extent, the amount of actual human-to-human exchanges, participation in society still requires communication abilities. In spite of the increasing prevalence of automated communication, actual human-to-human connections remain essential for optimal social fulfillment.

For the purposes of this essay, communication and language, specifically the language skills required for interpersonal communication, are differentiated into an ability to understand language (receptive language) and an ability to create language (expressive language). While both abilities are essential components of effective communication, abilities in one domain are not necessarily equal to abilities in the other domain, and one can have difficulty with either or both of these domains for a variety of reasons.

Because communication is so essential for navigating today's society, children with language delays are at risk for social and emotional adjustment difficulties (Ross & Weinberg, 2006); they struggle with the very basic skills necessary for ensuring that both their survival and social needs are met. Although children with delays in either expressive or receptive language struggle, the nature of their struggles may differ. Thus, in order to narrow some of the magnitude of the scope, the focus of this essay is upon expressive language delays and difficulties. Because expressive language delays and receptive language delays are often linked, it is important to note that limiting the delays completely to one domain or the other may prove impossible. In spite of this consideration, the main focus of this essay will be upon expressive language delays. Thus, unless otherwise-specified, general terms like "children with special needs" or "children with language delays," refer to children who for some reason or other have difficulties with expressive language.

Although many children with expressive language delays also have difficulties with the other aspects of language development, the expressive language piece is often the portion of the

language development that is the most severely hindered. This discrepancy between one's ability to understand language and one's ability to produce language can be incredibly frustrating, both for the child and the people with whom the child interacts. Inevitably, it can have a major impact on the child's social, emotional, and behavioral functioning (Horwitz, Irwin, Briggs-Gowan, Heenan, Mendoza & Carter, 2003).

Sources of Expressive Language Delays.
According to Owens (1996) in *Language Development: An Introduction*, in order for typical language development to occur a child must first have developed certain neurological processes and be able to perceive and distinguish certain sensory stimuli. Because of these prerequisites for language development, some of the most common sources of language disorders stem from problems with these two processes (Owens, 1996). With the exception of signed languages, most human languages have an auditory component, requiring a child's auditory system to be fully functional for optimal acquisition of language (Owens, 1996). In addition to having a functioning auditory system that is able to perceive the different sounds and phonemes, the child must also be able to discriminate between and process them (Owens, 1996). Thus, there must be optimal functioning of both the child's actual auditory system and the neurological pathways relaying information between the auditory system and the networked regions of the brain (Owens, 1996). Children who have problems with either of these systems predominately receive diagnoses of either Conductive or Sensorineural hearing loss. These forms of hearing loss can lead to expressive language delays due primarily to a child's physical inability to receive the stimuli necessary for appropriate language development (Owens, 1996).

In that same text, Owens (1996) further explains that "typical" language development also requires children to be able to make sense of the sensory input, necessitating an understanding of the rules, form, content and use of language. Although there is some debate as to the extent to which cognitive and language development influence and precede each other, it is

generally understood that a child must develop certain cognitive processes before he or she can sufficiently develop language. (Owens, 1996).

Theoretically, because the components of speech and language represent certain ideas and objects in the world, to truly develop language, a child must have certain representational capacities (Owens, 1996). Children with underlying cognitive disorders and/or impairments may have difficulty developing the representational abilities necessary for language (Owens, 1996). Thus, children with disorders like Down syndrome, Kabuki syndrome, chromosomal anomalies, and other disorders affecting cognitive development can often have co-occurring language delays.

The use of language also necessitates a certain component of social interaction (Owens, 1996). At its very core, language is a social tool that humans use to communicate their needs and form connections with other humans (Owens, 1996). Because the very nature of language is social, it is not surprising that many children with difficulties in social domains also develop delays with expressive language. Children with diagnoses on the autism spectrum often express delays within the realms of expressive language as they are uninterested in or incapable of sustaining social interactions extensive enough to develop an optimal understanding of the appropriate use of language (NIDCD, 2010). The "atypical" outcomes for these children often range in severity from the development of little to no spoken language to the development of spoken language without mastery of its appropriate use in a social setting (NIDCD, 2010).

Other children, for varying reasons, do not develop the oral motor skills imperative for the production of speech. This phenomenon is often seen in internationally adopted children, usually a direct result of institutionalized care practices (Miller, 2005). The majority of orphanages abroad exist merely to meet the basic survival needs of the many children they serve; they do not have the resources to provide enriching environments intended for the promotion of growth and development outside of their most basic levels (Miller, 2005). As a result of such

environments, internationally adopted children often exhibit delays across multiple domains of development.

In terms of these manifestations of delays due to environment, the expressive language delays seen in many internationally adopted children often result directly from orphanage feeding practices aimed at increasing the efficiency of food delivery (Miller, 2005). Oftentimes, the bottles given to children in international orphanages have nipples with large openings, requiring less effort and time for infant feeding (Miller, 2005). Although this method of feeding certainly ensures the infant receives food and thus, survives, babies need to utilize the muscles associated with nursing to develop the oral motor skills for optimal spoken language abilities (Miller, 2005).

Effects of Expressive Language Delays on Development.
Children with difficulties in language domains often encounter difficulties in social and emotional development (Ross & Weinberg, 2006). Language delays in young children appear to be associated with attention difficulties, social and peer interaction difficulties, and adaptability/regulation difficulties (Ross & Weinberg, 2006). Additionally, based upon the available longitudinal data, many children with early language delays exhibit diminished academic performance well into adolescence, and a good percentage are later diagnosed with psychiatric disorders or behavior problems (Horwitz, et. al., 2003).

In attempts to ameliorate these adverse effects and better the long-term developmental outcomes for these children, many different language supports have been developed and implemented. Due to the variance in the nature of both the delays and the children expressing the delays, the supports geared towards closing the gap between language comprehension and language expression are incredibly wide-ranging and varied. From intensive speech therapy, to sign language, to computerized assistive devices, clinicians and educators are constantly searching for ways in which to accommodate each child's language skills and remediate

development. This paper will explore supports seeking to lessen the impacts of language delays through the use of sign and signed language supplementing other verbal language scaffolds.

Definition of Sign vs. American Sign Language.

American Sign Language (ASL) is its own language with its own unique grammar and syntax (Humphries & Padden, 1990). Predominately, ASL is used by members of the Deaf community as a vehicle for self-expression; it unifies the Deaf community, serving as source of group identity and providing many Deaf and Hard of Hearing children with a first language (Humphries & Padden, 1990). Yet, children with expressive language delays stemming from sources other than Deafness most often already have exposure to a first language, and they need tools to enhance this language, not replace it. Because it is its own separate language with its own limited population fully utilizing and understanding it, ASL is not particularly useful as a support for children with expressive language delays stemming from sources other than deafness.

At the same time, however, the actual signs of ASL can be of use to children with expressive language delays. As a means of supporting the development of expressive language, these children can utilize the physical and iconic nature of some signs to supplement their verbal/spoken abilities. For the use of this paper, the terms "signing" and "sign" refer to this use of the ASL signs. Essentially, it removes the syntax and grammatical structure of ASL and transposes its vocabulary to that of English.

Review of Literature

Baby Signs.

Although speech is typically associated with the development of language, meaningful speech is actually one of the later processes to emerge in language development; a child is developing language and the skills for language long before the emergence of speech (Acredolo, Goodwyn, Horrobin, & Emmons, 1999). In recent years, the use of gestural signs programs with pre-lingual babies has become a popular means of facilitating communication between parents and their babies. These "Baby Signs" programs claim to give babies the ability to communicate

and participate in the social aspects of language long before they are actually able to speak (Acredolo, Goodwyn & Brown, 2000).

Through their research involving the use of Baby Signs programs, Acredolo et. al. (2000), have found that gestural signs give children a different, yet understandable way to communicate their needs to adults. Thought to act as symbols, these gestural signs give babies the tools to convey information, express their needs and intentions and communicate without words (Acredolo, et. al., 2000). This communicative ability may reduce tantrums and frustration, leading to better emotional regulation (Acredolo & Goodwyn, 1996).

These studies have also shown that gestural signing seems to impact and enhance language development as well. Initially, there was a general skepticism about the benefits of baby signs; many people seemed to think that children would simply rely on the signs instead of learning to speak. Acredolo et. al. (2000), however, have found that gestural signs do not impede the development of speech, rather, their research shows that signs seem to enhance its development. According to these studies, babies encouraged to use sign actually acquired speech more quickly and fluently than their non-signing counterparts. Based upon these results, Acredolo et. al. (2000) hypothesized that signs serve a transitory purpose, allowing babies to communicate before they are capable of doing so verbally. Based upon these findings, Baby Signs seem to, overall, have the potential to become a significant tool for optimal language and emotional development (Acredolo et. al., 2000).

While these results are certainly compelling and interesting, one must question, at least to some extent, the validity of such results. Because much of Acredolo et. al.'s (2000) research has been used as the foundation and promotion of Baby Signs Inc., a company founded by Acredolo and Goodwyn that markets Baby Signs products, one must question the researchers' incentive to obtain particular results. When looking more closely at the company and the research, however, one finds that much of Acredolo and Goodwyn's research into the nature of gestural

communication amongst young children was conducted prior to the foundation of the company. Furthermore, much of their research has been funded through grants from the National Institute of Health, a credible institution. Thus, it seems that although the researchers did have some financial incentive to obtain their results, their findings do have some reliability and credibility.

These studies have found that gestural signing can supplement the typical trajectory of language development. What about the trajectories of language development outside of what is considered typical? Can the findings in these studies involving baby signs be extended and applied to children with delays in language? If so, how might "symbolic gesturing" be used to promote language competency and support these children's language abilities?

Total Communication.
Although signing has been used in many circumstances amongst children with language delays, there does not seem to be a specific sign-based program or philosophy to which therapists subscribe. The closest program, "Total Communication," is an educational philosophy originally intended for children who are deaf and hard-of-hearing (Hawkins & Brawner, 1997). In an article on Total Communication, Hawkins and Brawner describe its philosophy as a focus on the adaptation of communicative methods, based upon an individual's unique needs, to foster optimal functioning and communication. In practice, Total Communication incorporates and combines multiple methods of communication to help a child who is deaf or hard-of-hearing function in a hearing world, depending on his or her particular needs. These measures typically include *both* language-based therapies like ASL or oral training *and* assistive hearing technologies like hearing aids or cochlear implants. In practice, this approach has often combined signing and speaking, strikingly different from the more traditional, singular method approaches.

Over time, the practices of Total Communication have been transformed and used not only amongst deaf and hard of hearing children, but other children with communication

difficulties. Because the most discerning feature of Total Communication is its commitment to meeting the unique needs of the individual child, it makes sense that its approaches would translate easily across populations. Amongst populations with special needs, Total Communication has come to represent the promotion of accessible communication, typically involving some sort of combination of manual signs and speech (Gibbs, 1990). Although the goal of Total Communication accommodations, and specifically Total Communication supports involving sign, is the same no matter the diagnosis—enhanced communication skills—the reasoning behind the approaches differs based upon the specific facets of the diagnosis (Gibbs & Carrswell, 1991).

For instance, in children with Down Syndrome, Total Communication supports seem promising because the signs act as transitional means of communication between the child's expressive language development and his/her development of communicative intentions (Gibbs & Carrswell, 1991). Theoretically, the combination of signs and speech give children with Down Syndrome both a visual and an auditory input, allowing them a better chance of reinforcing and processing the information presented (Gibbs & Carrswell, 1991). Additionally, signs provide alternative ways to receive or relay information if either a child's auditory system is functioning poorly due to frequent ear infections or the child's oral motor skills are impaired. (Gibbs, 1990).

For children on the Autism Spectrum, the foundation of the use of Total Communication supports with sign centers around the idea that signs are more iconic, and thus more easily processed than spoken language itself (Barrera & Sulzer-Azaroff, 1983). Additionally, for the significant number of children on the spectrum, who, despite intensive speech therapy do not acquire spoken language, signing's iconic nature is thought to make it ideal to serve as a primary means of communication (Barrera & Sulzer-Azaroff, 1983). Although the practice of signing amongst children with diagnoses on the Autism Spectrum has both its benefits and difficulties, it

nevertheless has seemed to show promise as a communication support for individuals with varying forms of Autism (Barrera & Sulzer-Azaroff, 1983).

Overall, Total Communication approaches for children with language delays seem to be promising because they allow for an individualized approach and address all aspects of language development. Although there was an interest in research exploring the benefits and disadvantages of this approach during the 1980s and 1990s, it appears to have slowed considerably, and there is little current research on the topic. This is perhaps due in part to advances in technology allowing for programs utilizing computerized assistive devices. At the same time, however, due to the adaptable nature of Total Communication and its willingness to include any sort of approach that might benefit the individual child, these supports could very well fall under the umbrella of a "Total Communication Approach."

Yet, programs including these technologies seem to remove some part of the human aspects of communication. With these methods, computerized voices literally "speak" for the child, and though they give him or her vehicles through which to be understood and able to communicate, they also lack a certain personalization and humanization of language. While these devices literally give children access to speech and, in spite of the fact that each child controls specifically what is spoken, the children are not actually producing language themselves. It is this lack of production that removes an important aspect of human communication. By actively producing language through signing, both communication and the information communicated become more directly connected to the individual.

Although the research available is very limited, Total Communication approaches have shown some initial promise. Because Total Communication, specifically Total Communication accommodations incorporating signing, could potentially provide children with language delays with an alternative approach to communication, there is a need to explore it further. Although not necessarily as convenient nor technologically-advanced as programs involving computerized

speech devices, sign-based supports could give children more of a personal investment in their production of language.

Research Problem

Clearly, pairing signing with speech can promote language accessibility for a variety of different children in a variety of contexts. Yet how does this use of sign take shape in the lives of children with special needs? Are there any potential implications for a child's language development, social development, emotional development or academic development? Are there any particular difficulties and/or benefits it might present? What does "signing" mean to the teachers, parents and therapists who interact with these children?

Methods

Approach

In order to understand the essence of sign-based communication in the lives of children with special needs, a phenomenological, qualitative study recording and exploring the experiences and perceptions of the children and adults utilizing sign as a communication support was developed and implemented. By definition, phenomenology seeks to uncover the fundamental nature of a certain experience by comparing multiple accounts of the same experience or type of experience (Creswell, 1998). A phenomenological approach seemed particularly appropriate for this study because it allows for the details of individual perspectives to be considered, while at the same time evaluating them in relation to the greater perspective of the experience.

Participant Sample

The overall sample consisted of a mixture of children, teachers and parents. The teachers participating in the study were identified after the researcher directly observed them utilizing sign with children with special needs. In order to be included in the study, the teachers had to have taught in the Tufts Educational Day Care Center for at least one year and had to have utilized sign with at least one child with special needs. Due to the school's incorporation of ASL instruction into the curriculum, every teacher also had at least some formal ASL instruction.

The children involved in the study were directly observed using sign to supplement communication in either educational or camp settings. After the initial observation, further information about the children and their varying diagnoses, uses of sign, etc. was obtained from the classroom teachers/camp staff. The children were then observed both formally through direct observation and informally through casual interactions occurring in their respective classroom or

camp settings. The observations ranged in time and frequency from several observations over two months in a classroom setting to daily observations over one week in the camp settings.

Several of the parents of the children observed using sign were selected to participate in this study. The parents of the children observed in the camp setting were contacted with the aid of the Arlington County Department of Parks, Recreation and Cultural Resources to determine their interest in participating in the study. Once participants consented, the Therapeutic Recreation Staff provided researcher with their contact information and a mutually convenient interview was scheduled. Of the children observed at TEDCC, one parent agreed to participate in a formal interview. She consented during an informal conversation with the researcher about her child's use of sign.

Teachers.
Nine teachers from the Tufts Educational Day Care Center (TEDCC) located in Somerville, MA were chosen as a sample of teachers. According to their website accessible via http://ase.tufts.edu/tedcc/default.aspx, the TEDCC is a NAEYC accredited day care center serving about 83 families throughout the greater Boston area. Consisting of four age-grouped classrooms, the Tufts Educational Day Care Center serves children from 2.9 years through 6 years of age. The center has a strong commitment to inclusion and groups children of varying needs and abilities by age. At TEDCC, each classroom receives weekly instruction in American Sign Language (ASL). The philosophy behind this instruction stems directly from the center's commitment to inclusion. Theoretically, by providing ASL instruction to the entire class, all of the children will have a common language with which to communicate. This common language not only promotes social interactions for children using ASL predominately as a means of communication, but also encourages all children to broaden their means of self-expression (TEDCC, 2010).

Although all of these teachers had experience using sign in the classroom and with

children with special needs, they ways in which they utilized sign varied. Of these nine teachers,

seven teachers had had direct experience working with children using some form of sign as a

primary means of communicating. Every teacher had had experience working with children

utilizing sign to help support their emotional needs or communication needs. Three teachers'

experiences stemmed primarily from the Kindergarten classroom, three's from the three-year-old

classroom, one's from the two-year-old classroom and one's from multiple classrooms. For

further information, please see Table 1: *Teacher Demographics*, listed below.

Table 1: Teacher Demographics.

Teacher	Classroom/Classroom Age Range	Experience
1	Kindergarten (4-6 years)	• two children using sign as primary means of communication • one child using sign as a means of emotional regulation
2	Red (3-4 years)	• one child using sign as primary means of communication • one child using sign as a supplemental means of communicating
3	Blue (4-5 years)	• two children using sign as primary means of communication
4	Red (3-4 years)	• one child using sign as primary means of communication • one child using sign as a supplemental means of communicating
5	Multiple (2.9-6 years)	• one child using sign as primary means of communication • one child using sign as a supplemental means of communicating
6	Red (3-4 years)	• one child using sign as primary means of communication • one child using sign as a supplemental means of communicating
7	Green (2-3 years)	• Multiple children using sign as a supplemental means of communication
8	Kindergarten (4-6 years)	• Individual Aide for child with special needs using sign as primary means of communication
9	Kindergarten (4-6 years)	• one child using sign as primary means of communication

		- one child using sign as a supplemental means of communicating - one child using sign as means of emotional regulation

Parents.

The parents involved with the study, with the exception of one parent who was identified through TEDCC, were identified with assistance from the Arlington County Department of Parks, Recreation and Cultural Resources Department of Therapeutic Recreation. All of the parents were mothers of children directly observed in the study. While each mother's child was of a different age and had a different diagnosis, all of the children were enrolled in inclusive preschool school programs. Within each of these inclusive programs, the children received some sort of classroom-based sign support. Prior to utilizing signs with their child with special needs, none of the mothers had experience with sign. For further information please refer to Table 2: *Parent Demographics*, listed below.

Table 2: Parent Demographics.

Parent	Child's Diagnosis	Child's Age Range	Use of Sign
1	**Down Syndrome** *Physical Features* (almond shaped eyes, flat face, low muscle tone) *Executive Functioning Difficulties* (hyperactivity, impulsivity, limited body awareness and motor planning difficulties) *Language Delays* (difficulties with articulation, speech and syntax processing, limited vocabulary, mostly one word utterances with verbal approximations)	Preschool	Currently, a supplement to spoken language—initially primary means of communication
2	**Chromosomal Anomaly** *Physical Features* (short stature, low muscle tone, gross motor delays) *Language Delays*	Preschool	Currently a supplement to spoken language—initially primary means

	(expressive language difficulties, one/two word utterances, verbal approximations)		of communication
3	**Developmental Delays** • *Language Delays* (expressive, speech/syntax processing difficulties) • *Gross Motor Delays* (low muscle tone, small stature)	Preschool	Always a supplement to spoken language

Children.

This portion of the sample consisted of seven children attending inclusive programs at either the Tufts Educational Day Care Center or the Arlington County Department of Parks, Recreation and Cultural Resources. All of the children were enrolled in either inclusive preschool or elementary school programs and received some sign-based support in those classrooms. The three children observed at the Tufts Educational Day Care Center were observed directly in their classroom setting. The four children attending programming with the Arlington County Department of Parks, Recreation and Cultural Resources were observed in an inclusive camp setting where they received some sign-based support. The participants in the sample ranged in age from three years of age to six years of age with the mean age being four years of age. While the participants were predominately male, both genders were represented with 85% of participants being male and 15% of participants being female. The children involved had varying diagnoses, with only two of the children sharing diagnoses. Although three of the children had used signing as a primary means of communication in the past, only one of the children currently relied on the signs in this way, and even he was working to utilize some combination of speech and sign. For further information, please refer to Table 3: *Child Demographics*, listed below.

Table 3: Child Demographics.

Chil d	Ag e	Diagnosis	Use of Sign	Gende r	Setting

1	4	**Developmental Delays** • *Language Delays* (expressive, speech/syntax processing difficulties) • *Gross Motor Delays* (low muscle tone, small stature)	Always a supplement to spoken language	M	TEDCC
2	5	**Developmental Delays** • *Language Delays* (expressive, speech/syntax processing difficulties) • *Executive Functioning Difficulties* (shortened attention span, hyperactivity, body organization and planning difficulties, impulsivity, self-regulation difficulties)	Always a supplement to spoken language	M	TEDCC
3	6	**Autism** • *Executive Functioning Difficulties* (shortened attention span, hyperactivity, body organization and planning difficulties, impulsivity, self-regulation difficulties, self-stimulating behaviors) • *Fine Motor Delays* (extremely apparent inabilities and difficulties with even the most basic fine motor tasks and tactile dexterity) • *Language Difficulties* (limited speech abilities, repetitive and rigid use of language)	Always a supplement to spoken language	M	Arlington County Dept. of Parks and Recreation

4	3	**Down Syndrome** • *Physical Features* (almond shaped eyes, flat face, low muscle tone) • *Executive Functioning Difficulties* (hyperactivity, impulsivity, limited body awareness and motor planning difficulties) • *Language Delays* (difficulties with articulation, speech and syntax processing, limited vocabulary, mostly one word utterances with verbal approximations)	Currently a supplement to spoken language—initially primary means of communication	M	Arlington County Dept. of Parks and Recreation
5	3	**Chromosomal Anomaly** • *Physical Features* (short stature, low muscle tone, gross motor delays) • *Language Delays* (expressive language difficulties, one/two word utterances, verbal approximations)	Currently a supplement to spoken language—initially primary means of communication	F	Arlington County Dept. of Parks and Recreation
6	4	**Klinefelter's Syndrome** • *Physical Features* (short stature, low muscle tone) • *Expressive Language Delays* (little to no verbal language, minimal word approximations) • *Executive Functioning Difficulties* (short attention span, motor planning difficulties, self-stimulating behaviors) • *Fine Motor Delays* (poor muscle control, limited abilities with writing tools, poor tactile dexterity)	Currently primary means of communicating, though working to transition to some verbal communication	M	TEDCC

| 7 | 3 | **<u>Fetal Alcohol Syndrome</u>**
• *Physical Features* (almond shaped eyes, flat face)
• *Sensory Processing Difficulties* (easily over-stimulated)
• *Expressive Language Delays* (limited vocabulary, mostly one/two word utterances, syntax processing difficulties)
• *Executive Functioning Difficulties* (short attention-span, self-regulation difficulties) | Currently a supplement to spoken language—initially primary means of communication | M | Arlington County Dept. of Parks and Recreation |

Data Collection/Measures

Teachers.

Selected teachers participated in semi-structured interviews designed to make explicit their perceptions of the potential impact of signing upon the social, emotional and language development of children with special needs, as well as document their personal experiences with signing. The semi-structured nature of the interviews ensured that these specific topics were covered, while at the same time allowing some flexibility for the informants' experiences to shape and guide the conversations. Although the interviews were all structured from a specific set of interview questions, the order, wording and number of questions changed from interview to interview depending on the participants' unique responses to, details provided from and interpretations of the questions. For an example of the guiding questions used to conduct the interviews, please refer to Figure 1: *Teacher Interview Guidelines*

In order to promote accuracy and consistency across interviews, all interviews were conducted by the researcher, who is further described in the subsequent researcher section. Although this level of consistency promotes a certain level of reliability, it also conveys potential

biases as well. Despite ensuring that the emphases of the questions were similar, only having one interviewer limited the potential foci and nuances of the questions asked. Additionally, after conducting several interviews, the one researcher may have developed expectations for participants' responses, and subconsciously attempted to prompt these expected responses.

With the exception of one interview which took place in an empty office space, all of the interviews took place within the classrooms of TEDCC. Because of the interviews' situations within the classroom contexts, they provided opportunities to both inquire about the teacher's experiences as well as observe the classroom contexts and environments.

So as not to inhibit the flow of the conversation, in addition to accurately recording each participant's interview, each session was audio-taped. Immediately upon completion of the interview, the audio-tapes were transcribed to text. Although interruptions and non-meaningful filler words were removed from the final transcript, great efforts were made to ensure that transcriptions were accurate and precise. For an example of a transcribed interview, please refer to Figure 2: *Sample Teacher Interview Transcription*.

Parents.
The parents participating in the study were also interviewed by the researcher. They too were asked questions seeking to determine their perceptions of sign and document some of their experiences using sign with their children. These interviews were also semi-structured in nature, with the intention that the interviews maintain conversational-like flow, while at the same time ensuring the coverage of certain topics. The questions guiding the interview were structured very similarly to those used for the teachers, though geared towards the unique experiences and perspectives of parents. For an example of the nature of questions asked to the parents, please see Figure 3: *Parent Interview Guidelines*.

Again, to ensure consistency, all of the interviews were conducted by the researcher, despite the aforementioned potential for bias. Additionally, the parents were interviewed in their

homes, with the average interview lasting about forty five minutes. The parent interviews, like the teacher interviews, were initially recorded via audio-tape and subsequently transcribed to text. Again, great effort was taken to transcribe each interview accurately, although unnecessary filler words and interruptions were deleted from the final transcript.

Children.

The seven children participating in the study were all observed in their respective inclusive camp or school settings. Although many of the children were observed more traditionally, as the observer's only role was to observe and record her observations, the majority of the children were observed more informally as the researcher observed and interacted with them due to the nature of her work as a teacher and camp counselor. In both cases, however, the subject's overall sign abilities, sign preferences, use of sign and responsiveness to adult sign were noted and recorded after each observation session. It is important to note that while efforts were made to objectively record the observations in these domains, the very nature of these categories are somewhat subjective and difficult to quantify. Although by having only one researcher record and evaluate the subjects' behaviors there was some semblance of consistency, the researcher's evaluations are based upon her own interpretations and inherently biased.

Researcher Background

All of the interviews and observations described in the previous sections were conducted by Katie Hyder, an undergraduate child development major at Tufts University. In accordance with the departmental guidelines at Tufts, she followed a course of study ensuring exposure to the basic theories and research concerning children's social, emotional, cognitive and physical development. Beyond these foundations, she developed a particular interest in children with special needs and sought out courses specializing in the developmental applications of psychology, education, and research methodology. Supplementing her classroom experiences with internships in the fields of international adoption medicine, early childhood education and

special education, she has also gained a more practical exposure to child development. It was through her placement at the Tufts Educational Day Care Center that she first gained exposure to the integration of sign-based communication supports within the practice of Inclusive Early Childhood Education. These initial observations led to the development of the study described in this paper.

After initially consulting the literature and formulating questions integrating her observations with what was available in the literature, the researcher realized that the study required a qualitative/interpretive approach. Because she had no background in qualitative research methodology, the researcher enrolled in the qualitative research methods course offered by the Eliot Pearson Department of Child Development at Tufts University. This course, taught by Professor Jayanthi Mistry, introduced students to several major approaches to qualitative research design including Narrative, Ethnography, Grounded Theory and Phenomenology. Over the course of the semester students discussed each of these methodologies in depth, discussing the types of questions for which each would be appropriate, the various instruments applicable for data collection, and multiple strategies for data analysis. In order to ground these theories in practice, each student was asked to design and implement a "micro-study" to completion, covering all portions of the research process. It was through this class that the researcher gained the experience and skills necessary to design and implement the study described in this text.

In addition to this background and the development of these skills, the researcher was fortunate to have access to two different settings through which she could observe these sign-based supports in practice. Her placements within the contexts of The Tufts Educational Day Care Center and the Arlington County Department of Parks, Recreation and Cultural Resources, afforded her the unique position of participant observer. Due to her established roles as a student teacher and/or individual facilitator within both of these communities, she was able to utilize her understanding of the philosophies and educational attitudes of each program to guide her

observations, interviews and participant selection. These roles also allowed her to draw from a more in-depth knowledge of the participants' backgrounds, personalities and circumstances.

Although this integration and familiarity certainly led to a fuller understanding of the participants, it also prohibited a certain level of objectivity; she could not completely separate her role as a researcher from her role as a participant situated within each of these communities. Additionally, because she had witnessed the success of sign-based language support prior to this study, her approach to the study was inevitably influenced by this positive perception. Even though she took every effort to remain objective when approaching the interviews, observations and analyses, it would be incredibly difficult, if not impossible for her to completely remove the influences of this experience upon her perspective. This lack of objectivity is the most salient of the potential biases in the study.

Analysis

The transcriptions from the parent and teacher interviews were gathered and analyzed first using closed coding. Before beginning the coding process, an overall "start list" was developed, and the interview transcriptions were analyzed in accordance with these coding categories. This initial list included such general categories as: challenges, uses of signs, social implications, comfort with sign, prior experiences with sign, opinions, and environmental factors influencing sign. For definitions and descriptions of each coding category, please refer to Table 4: *Coding Categories and Explanations*.

As the coding process and data analysis progressed, further dimensions of each category/code began to develop, and open coding was used to expand the initial codes. For instance, the category "uses of signs" was further delineated into "caregiver uses of signs" and "child uses of signs." Upon subsequent return to the data, the researcher identified further dimensions of these categories. For example, "caregiver uses of sign" became further broken

down into "caregiver uses of signs in general" and "caregiver uses of signs with children with special needs."

After the initial coding process, following Miles and Hubberman's (1994) plan of matrix analysis, within-case data reduction charts for each code were created based upon the data from each interview or observation. Initially, these charts contained all quotations from the interviews that were designated under a particular code. In order to make the charts more usable, the information was further reduced into charts briefly summarizing the information relevant to the code/category. This summary not only allowed for further reduction of the data, but also a better understanding of the dimensions of each code. For an example of these within-case data reduction charts, please refer to Table 5: *Within-Case Data Reduction Chart Example*.

After creating within-case data reduction charts, the individual charts for each code/category were combined into an across-case chart. For further ease of organization and more effective management of the data, only the charts containing the summaries of responses within a code were used for the construction of the across-case chart. Restricting the across-case charts to the summaries not only allowed for more effective data management, but also an increased awareness of emerging patterns. For an example of a partial across-case data reduction chart, please refer to Table 6: *Across-Case Data Reduction Chart Example*.

Following the coding and data reduction, the researcher evaluated the data again, this time focusing on the potential emerging patterns. These patterns were noted and used to develop potential hypotheses regarding the social and emotional implications of the use of sign with children with special needs.

Results

Teachers

Teacher 1.

This particular teacher indicated that she regularly used sign both with children with "typical" developmental trajectories, as well as with children with special needs. Although she had never had signing experience prior to working at TEDCC, she quickly found it useful and readily incorporated it into her everyday classroom interactions, often combining it with speech to help reinforce verbal cues. During her tenure at the center, she worked with two children using sign as a primary means of communicating. Outside of her experiences with these two children, she also observed children with special needs using sign as a support to their verbal skills, specifically as a means of self-regulation. For instance, she described one child using it as an emotional outlet, responding with signs when too distraught to communicate verbally.

For this teacher, signing seemed to be a means of empowerment. In her experiences with the child mentioned previously, it was interpreted that signing allowed him to maintain some control in a situation where he felt powerless. She described it as a means of emotional empowerment. Furthermore, this teacher's experiences indicated that signing can support children socially and communicatively. Essentially, she found that signing empowered children to realize that they have access to various means of communicating and expressing themselves. It showed them that even if they were unable to verbalize using words, they were just as capable of and entitled to self-expression as those capable of using words.

Despite these positive attributes associated with sign, she identified two potential challenges. Because some children's sign is unclear due to fine motor difficulties, one must be familiar with the child and his/her specific use of sign. Additionally, a lack of familiarity with signing in the general population leads to difficulties in universal comprehension of the child. In spite of these concerns, however, she indicated strong support for the use of signs as a tool for children with special needs.

Teacher 2.

At the time of this interview, this teacher utilized sign as a support for a child in her classroom who had extremely limited verbal capabilities. Although she and her co-teachers attempted to have this child combine speech sounds with his signs, he predominately relied upon signs as a primary means of communication. During the interview, this teacher stressed the importance of knowing the child with whom one is working and having familiarity with his or her methods of signing. For instance, the child with whom she currently worked lacked the fine motor capabilities to fully form "accurate" signs. Because of these fine motor difficulties, this child consistently used his own versions of the signs when communicating. Even though his signs could be difficult for others to discern, in this teacher's experiences, the child was patient when other adults and/or children were incapable of understanding what he was trying to communicate to them. This teacher noted that, if his initial signing communication attempts failed, the child looked for other ways to get his point across.

This particular teacher proposed that signing helped this particular child in his social endeavors, giving him a means through which to show he was interested in and capable of communicating with his caregivers and friends. Though the child in question predominately used signs as a means of meeting his basic needs, this teacher found that the child also used sign to represent larger concepts and ideas. For instance, she noticed this child used practical signs like "more" and "all done" to indicate his preferences and desires in addition to specific gestures to represent the names of songs and games that he enjoyed.

Teacher 3.

This particular teacher's main experience with signing involved a child who relied on signs as a primary means of communication. Although she found the process very helpful and empowering for the child in question, she also found that it required a lot of teacher facilitation and supervision. Primarily, in this teacher's experience, signing gave this child a means of access to his peers that he would not otherwise have had. In addition to giving this child a means of

accessing his peers, this teacher felt as though sign opened a means of communication with adults. To her, signing allowed this child to gain confidence in his own capabilities of expressing his needs and desires. Furthermore, this teacher proposed that signs gave this child the security to know that the adults with whom he communicated would be responsive and receptive to his expressions of these needs.

Teacher 4.

Especially when communicating with children with limited verbal abilities, this particular teacher found signs to be useful not only when trying to understand the child, but also when helping the child comprehend an idea or direction. Although the child this teacher worked with predominately used signs as a means of indicating his basic needs and preferences (i.e. "more," "all done," etc.), he observed that the child progressed quickly from very basic signs to signs with a more playful nature (i.e. utilizing gestures from songs and games to indicate a particular song or game). He also noted that the child was drawn to signs that were particularly reflective of his interests.

In order to sustain peer interactions, the teacher indicated that this child's use of sign with peers required some scaffolding from adults. Despite the need for adult support in these capacities, however, his peer interactions were observed to have increased substantially over the course of the year. Although this teacher found that the signs were particularly useful in terms of this child's social development, he indicated that the most salient aspects of signing stemmed from its ability to show children that there are multiple means of communicating, and that these means of communication can be just as powerful as speech. The teacher found that this child's use of sign helped show the other children in the classroom that all children are capable of communicating, and that everyone has important thoughts, opinions and feelings. Essentially, this teacher felt that signs give children with verbal difficulties an increased independence and

increased opportunities to express preferences and opinions, and thus, is a proponent of using sign as a tool for children with limited verbal skills.

Teacher 5.

This particular teacher had a wide variety of experiences using sign with children with special needs. In addition to her work as a teacher in many of the classrooms at TEDCC, she was studying to become a speech language pathologist. In regards to her speech language pathology education, she noted that while professors did not support using sign-based approaches for children with special needs, the majority of the therapists whom she had observed did utilize it in practice. Despite the contradictory attitudes of her classroom professors and practicum supervisors, this particular teacher supported the use of sign as a supplement to the development of spoken language.

In her experiences working with children with varying language abilities, this teacher found sign to be useful across multiple contexts. When facilitating communication for children with extremely limited verbal skills, she found sign to be particularly helpful for clarification and basic interactions. For children with more developed verbal skills, she found that signing transcended the facilitation of basic communication, serving as regulatory tool for children. In one particular instance, this teacher described how signs helped a child who was too shy to do so verbally, find a way to communicate his ideas, thoughts, needs and feelings. In her experience, signing gave this child a means of security, empowerment and control in situations where he seemed uncomfortable or overwhelmed.

Teacher 6.

This teacher originally incorporated sign into the classroom for a specific, non-verbal child, but was pleased to see sign become a beneficial regulation tool for other children as well. For one particular child, she found that signing became a really powerful alternative to spoken language as it gave the child a way of communicating in situations where she felt too overwhelmed to do so verbally. Furthermore, this teacher noted that simply having this access to

sign helped the child "open up" and communicate more verbally; it was almost as if simply

having that second option was enough to help her develop the sense of confidence and security

that she needed to speak.

This teacher also felt that sign could be a useful tool for helping children understand that

there are multiple means of expressing one's self, and that these means of communicating can be

just as effective and powerful as spoken language itself. Specifically in regards to her

experiences with a child using sign as a primary means of communication, this teacher found that

signing furthered his access to peers and provided him with a vehicle through which to express

his desires, opinions and needs. To her, the signs gave him a means of reinforcing to the adults

and children in the room that, in spite of his communication difficulties, his thoughts and

opinions were just as important as those of the other children in the room. Although she felt as

though the incorporation and success of sign required a lot of initiative, effort and support from

herself as a teacher, to her, the power sign gave to the various children in her classroom was

worth the effort.

Teacher 7.
Working with the youngest children in the center, this teacher found that sign was a

beneficial tool in her classroom. Originally anticipating sign to be beneficial only when working

with children with special needs, she was pleased to find similar benefits when incorporating

sign for all children. Because of where the children in her classroom were in regards to language

development, she found that many of her children struggled to verbally communicate their

thoughts and desires. In her experiences, sign showed children that they do have the capabilities

of communicating their desires and needs, even if they cannot do so verbally. It is in these

situations that she found sign to be truly empowering.

In addition to supplementing these basic communications, this teacher also described

specific instances where sign helped children who were otherwise too shy and/or overwhelmed

develop the confidence to express opinions and communicate in social situations. In these cases, she noted, the sign provided a way for children to express themselves while at the same time maintaining a sense of security and safety.

Teacher 8.
The majority of this teacher's experience using sign with children with special needs came from her work as an individual aide for a child with extremely limited verbal skills. Prior to working with this child, this teacher had received extensive ASL instruction at the collegiate level. Although she overall found the signs to be a positive communicative tool for this child, she noted that his co-occurring fine motor difficulties limited his ability to produce the signs. These limitations in the production of the signs inevitably limited the extent to which he was able to be understood. Despite these limitations, however, she noted that many of his approximations were very close to the actual sign, and given the right context, knowledge of the child and knowledge of the actual sign, one could easily discern what he was attempting to communicate.

This teacher also remarked that the child with whom she worked would utilize the signs when working individually with her, almost as if he knew that it was a way for the two of them to efficiently communicate. In addition to promoting this child's access to adults, the teacher found that the signs also increased his access to his peers. In her experiences, the other children in the class were very sensitive to this child's communication difficulties and were receptive to using sign with him. She found that many of the children even sought out the child using signs; they seemed particularly motivated to ask him questions and were excited by his signed responses.

In addition to providing this child a means of communicating and access to his peers, this teacher felt as though signing helped enhance this particular child's understanding and comprehension of language. She noted that the child would often respond better to verbal information when it was paired with a sign. Although the teacher noted these benefits

specifically in this one child, she strongly believes that signs can be a beneficial educational tool for multiple children as signs give children multiple means of processing information; when utilizing sign children see the sign (visual), make the sign (kinetic) and speak/hear it (auditory).

Teacher 9.
This particular teacher had experiences with both a child who utilized signs as a primary means of communication, as well as with children who utilized signs as an extra means of regulation. A firm believer that sign truly opens communication possibilities for children, particularly those with limited means of communication, she wished that both she and the larger world had more extensive experience and familiarity with sign. To her, signing could become an important means of not only communicating basic needs, but also expressing emotion.

In her experiences, she found that sign helped children who were upset or out of control regain composure and express their feelings. Additionally, because signing accesses multiple pathways of information, she felt it could be used as a supplemental educational tool for all children. Although she expressed concerns about the contextualized use of signs with children who have limited verbal skills (i.e. using it only with teachers and/or other adults), she reasoned that some vehicle of expression is always better than none. Furthermore, while she did acknowledge that incorporating sign into the classroom took effort, once it was incorporated, she found sign to be easily integrated and fairly self-sustaining.

Summary.
Overall, the teachers seemed to be very supportive of the use of sign as a support for children with special needs. Although the specific ways in which teachers observed children using sign varied, most teachers indicated that children either used the sign as a primary means of communication or as a means of self-regulation. Additionally, many teachers used sign to reinforce verbal information and felt it gave children a sense of empowerment. While many teachers expressed frustrations with both their own limited knowledge of sign and an unfamiliarity of the overall population with sign, they still felt as though it was a great vehicle

through which children could communicate. Furthermore, many of the teachers indicated that in order for the sign to be truly effective as a means of support, one had to truly know the child and be familiar with his or her variations of the sign due to the effects of fine motor difficulties on the child's ability to produce "accurate" signs.

Parents

Parent 1.

This particular parent was the mother of a child diagnosed with Down syndrome. She was first introduced to the idea of utilizing sign with her child through the various therapists and students involved with Early Intervention. She vividly remembered her son's first sign. Apparently, he first used sign to indicate his need for a new diaper; he signed in order to directly communicate a basic need.

This parent indicated that her son was incredibly interested in communicating and socializing with others; he was always drawn to people and would do anything to make others laugh. In spite of these social tendencies, however, the manifestations of his Down syndrome diagnosis made it very difficult for him to acquire spoken language. Because this child was very interested in communicating and connecting with people, but his verbal language skills prohibited him from doing so, signs became an important tool for him to sustain the social interactions that he craved. In this mother's experience, signing gave her son a means of meeting his needs, accessing other people and developing effective communication skills.

As her son's verbal language skills progressed, she noted that his interest in signing seemed to decrease. Although he continued to respond to sign, and if he had difficulty communicating would revert to using sign, she acknowledged his preference for oral communication. In spite of his inclination towards verbal language, this mother felt as though signing was a great tool for initially showing her child that he was capable of communicating his own needs, desires and thoughts to others.

Parent 2.

This particular parent had a child diagnosed with a chromosomal anomaly. Because this diagnosis is often associated with language difficulties, the mother indicated that she and her husband were advised to focus on encouraging and supporting their daughter's language development. Though it was the child's neurologist who first suggested that the family consider sign, it was the family's speech therapist who first introduced them to the actual signs. Once the therapist felt as though the child had made sufficient developmental progression, signs were incorporated into the sessions. In order to further promote the use of sign, the family also began to watch the *Signing Time* videos.

This mother indicated that her child was always capable of and interested in understanding language. Due to the manifestations of the diagnosis, this child was initially unable to express herself or indicate just how much she understood. Once her daughter began to master some of the signs, however, signing became the child's primary means of self-expression; the signs became a way for her daughter to show what she understood, thought and needed.

At first this parent, her husband and their therapists focused on giving the child signs that would allow her to gratify her basic needs (i.e., more, all done, yes, no, etc.). Within a few months of pre-school in a signing-supported program, the signs that the child began to recognize and use exceeded the ones with which her parents were familiar. Although the mother indicated a sense of excitement at her daughter's increasing skills, she also indicated anxiety about potentially misunderstanding her daughter's communications. Thus, in order to ensure that she, her daughter and her husband could optimally communicate, within that first year, they hired a tutor to work with the entire family on signing and ASL.

This mother indicated that occasionally she and her family would require signs that were too complicated or physically demanding for a three year old to both replicate and understand.

Instead of allowing this to impede their communications, the family developed its own versions of the sign. For example, the "official" sign for avocado involves finger-spelling the word. This task is developmentally inappropriate for even the typically developing preschooler. Therefore, the family created its own signs for certain fruits and vegetables. Even though these "home signs" were not "official" signs, the mother felt as though they gave the family a beneficial means of communicating with and understanding one another. This mother also noted that, due to the fine motor implications of her daughter's diagnosis, many of her child's signs were approximations. Although she indicated that recognizing her daughter's versions of the signs required time and effort, overall the signs continued to serve a productive means of communication.

In spite of these difficulties, this mother felt as though sign increased her child's language abilities and served as a great support for her child. In addition to providing her daughter with increased opportunities to express herself, it seemed to have facilitated some of her daughter's more recent social gains as well. For example, before sign, the child mostly interacted with adults. Recently, the child began to progress to more peer-focused interactions, including parallel play. To this parent, the most striking aspect of the sign was its ability to allow her daughter to make herself understood and have her "voice" heard. To this mother, this access to independence and autonomy was the true power of sign.

Parent 3.
This mother had a child diagnosed with general developmental delays. Although her child did not ever utilize sign as a primary means of communication, she found signing to be a wonderful, yet unexpected resource. She indicated that sign seemed to give her child, at least in the school setting, a means of making himself heard. Prior to his introduction to sign, her child was incredibly shy and reluctant to participate in the classroom. As part of his classroom curriculum, he received ASL instruction, and he seemed to have a particular affinity for it. Once

his teachers discovered his natural attraction to sign, they encouraged him to develop and use it, which led to a gain in confidence, participation and expression. Even though she did not actively seek out sign for her child, the mother indicated that she was pleased with the role it has played in her child's preschool development. In this particular case, sign seems to have been particularly effective as it has given a child with a natural shyness a way to communicate, while remaining in his comfort zone.

Summary.
Although the parents' experiences with sign varied, all of the parents interviewed seemed to indicate positive perceptions of their respective children's usages of sign. For two of the participants' children sign was particularly helpful because it allowed them children to actually have a means of communicating. In these parents' experiences, sign became a means for their children to indicate their needs because they were unable to do so verbally. Additionally, these parents noted that signing provided a way for their respective children to explore and increase their social tendencies; it allowed the children to make certain initial social advances that otherwise would have been limited by their restricted verbal skills. Although one parent indicated that her child still relies heavily on the sign, both participants indicated that their respective children were moving away from the sign and moving towards spoken language.

For the other parent in the study, signing was never her child's primary means of communication. Rather, for her child, signing became a secondary means to express his thoughts, opinions and feelings within the school context. In her experience, signing allowed her child to gain a sense of confidence and security in a context where he felt overwhelmed and/or intimidated.

Children
Child 1.
Diagnosed with general developmental delays, this child was working to strengthen his language, gross motor strength and fine motor abilities. This child was observed using signs on

multiple occasions, primarily at snack time. Additionally, teachers supplemented these observations with remarks about this particular child's natural inclination towards and interest in sign. Teachers noted that he often asked about the signs for different words spontaneously and would participate actively in ASL class.

When observed during the snack time interactions, this child seemed to be using the signs almost as a means of negotiation. The following exchange was observed on multiple, separate occasions. After sitting at the snack table and beginning to eat snack, the child approached the teacher, informing her in a high-pitched, almost timid voice that he was "all done." The teacher then asked him if he had finished all of his yogurt, cereal item, etc. The child then showed her the remainder of his snack.

Because this child was working on gaining weight, it was important for teachers to encourage him to consume as much as possible during snacks/meals. Obviously, the teachers used their discretion in regards to balancing between over-encouraging him and encouraging him to finish as much as possible. Keeping this balance in mind, they actively encouraged him to finish whatever snack he has started. Thus, when the child approached the teacher with half eaten cereal, yogurt, etc. she asked him to please try to finish the respective food item. At this point the child began negotiating with her, asking her "How many bites?" Without waiting for her answer, he said "This many," and showed her the ASL sign for three[1]. The teacher then responded to his request using a combination of sign and speech. She said to him, "How about we start with this many, OK?" She accompanied this verbal request by simultaneously showing him the sign for five. The child then took a few minutes to negotiate the number of bites he would have to take. Although each time he signed the exact numbers changed, the numbers he used consistently matched their respective ASL signs. Eventually, the teacher and child came to an agreement.

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1 : Although one might initially think that he was merely using his fingers to show her the number of bites he was interested in taking, he was using the actual ASL sign for three, which differs slightly from the traditional holding up of three fingers.

Once this consensus had been reached, the child simply signed yes and continued working on his snack.

Child 2.

This particular child was observed utilizing signs seemingly as a means of emotional regulation and support. Due to generalized developmental delays, this child had difficulties predominately with executive functioning and attention, though some of the delays were in the domains of language. During the observation the following exchange was noted:

The child was playing at a table with Legos. Although his initial play experience seemed to be unfolding amicably, a disagreement between this child and another child began to unfold. As he reached for a Lego, another child reached for the same Lego. The other child was slightly quicker and reached the Lego first. He then added it to his structure.

In response, the child approached the other child and said "Hey! That's not fair, I wanted that Lego." The other child ignored his communication attempts, and the child seemed to become increasingly upset. Eventually, his frustration seemed to peak; he jumped up and down and screamed "I wanted that!" This outburst attracted the teacher's attention, and she scolded the child. Informing him that screaming was not OK in the Kindergarten, she added that the activity was now closed to him. The child responded by running to the group area, crouching into a small ball and crying.

After a few minutes, the teacher approached the child, who subsequently began rocking back and forth in the crouched position. Although the teacher made several attempts to engage with the child, he continued rocking and crying. After inquiring about the incident and how it made him feel, the teacher reminded the child that if he was not able to "use his words," he could respond using sign. The teacher than began asking him yes/no questions about his feelings. First, she asked him if he was feeling frustrated. Without looking at her, he signed yes. She then asked him if the friend had done something he did not like. Again, he signed yes. Maintaining his

crouched position, his rocking ceased. The teacher then asked him if when he got frustrated by something a friend was doing it was OK to scream and yell. The child then signed "No." She then asked him how he would feel if a friend screamed at him. The child responded with the sign for sad.

After this exchange the teacher asked the child if he was ready to tell her about the problem. The child signed yes, sat down and described to her the incident. The teacher and the child were then able to discuss alternative solutions to the problem and the child resumed playing in another area of the classroom.

Child 3.
This particular child was observed on his first day in an inclusive summer day camp program for four to six year old children. Diagnosed with autism, this child was known to have extensive fine motor difficulties, difficulties sustaining social interactions, a shortened attention span and a rigid, stereotyped use of verbal language. Although this particular day was his first day, the camp had actually commenced on the previous day.

The child, his mother and his sister entered the classroom and were greeted by the staff members. During this exchange, the child appeared very excited and distracted; he was flapping his hands constantly and his eyes were darting around quickly. After meeting the camp staff, the child was introduced to his individual aide. In an attempt to engage with and get to know the child, the aide asked him what he liked to play. Without making eye contact with her, he excitedly made the sign for ball. Because his hands were shaking and the sign was somewhat indistinct, it was somewhat difficult to distinguish exactly what he was signing. Even though this aide had had experience using sign, she looked at him quizzically at first. After his mother "translated" for him, the individual aide seemed to understand that he had unique way of signing.

After this realization, the individual aide began to make observation statements and ask elaborating questions, most likely in an attempt to establish an easy relationship with the child.

"Oh," she said "You really like to play with balls!" The child smiled and signed yes. "What is your favorite thing to play with balls?" He then mimicked shooting a basket. "Are you saying that you like basketball?" she asked. In response, the child smiled, nodded and said, "Yes!"

As the day progressed, whenever the child needed to communicate with an adult or needed help with an art activity due to his fine motor skill difficulties, he would look to her for help. By the end of the day his perceived nervous excitement (i.e. darting eyes and flapping behaviors) seemed to lessen. Although he continued to be easily distractible and some of his flapping behaviors also persisted, these behaviors dramatically decreased in intensity.

In addition to this initial signing exchange with the ball, the child was observed using the sign for bathroom with the aide. This particular child was very prone to accidents and was working on recognizing when he needed to use the bathroom. Because the staff members were aware of this factor, they were prepared to check in with him frequently and had a bathroom schedule in place. When the time came to have him check, the individual aide approached him. While simultaneously making the sign for restroom, she said "Let's take a quick break and check to see if you need to use the bathroom." After her initial approach with the sign, any time the child independently felt the need to use the bathroom, he would walk over to the aide and make the sign for bathroom. He was only observed to use sign when indicating his need for a bathroom this first day, though the aide reported that by the end of the week, he predominately alerted her of this need verbally.

Child 4.
For this child, signing seemed to be a tool to enhance his receptive language skills. At the time of observation, this child's use of verbal language was limited to predominately vocal approximations and simple one to two word phrases. Diagnosed with Down syndrome, this child had difficulties with executive functioning in addition to these language delays. This child was observed over the period of several days in an inclusive pre-school camp setting, and was only

observed using signs with adults in the program. He was never observed to utilizing sign with another child, seeming to favor verbal communication.

Prior to the start of camp, his mother indicated to staff that signing was an effective means of communicating with him, and in turn understanding him. During his experience at camp, however, he was never observed to initiate communication using sign. Nevertheless, signing seemed to be effectual for teachers to utilize in their interactions with him.

For example, this child needed clear boundary indications and would occasionally attempt to test these boundaries by running away. On days when prior to playing outside, the teachers physically indicated the boundaries, verbally told him to "Stop here," and reinforced their words with the sign for "Stop," he was observed to stay within the confines of the playground. Conversely, on one of the days, the teachers did not accompany their verbal warning with a sign. This day, the child attempted to run away from the staff members, crossing the boundaries initially indicated to him.

Although this child always seemed to respond to sign, he would attempt to utilize verbal responses first. If, after several word/phrase approximations he was still having difficulty being understood, then he would use the sign. It was almost as if he was utilizing sign as his contingency plan for clarifying his initial verbalizations.

Child 5.
Due to a chromosomal anomaly, this child's gross motor, fine motor and language development were somewhat delayed. Although this child utilized some vocalizations and sounds, she predominately seemed to rely on nonverbal means of communicating in order to navigate throughout the inclusive pre-school camp setting in which she was observed. Over the course of several observations, it was clear that she understood and responded to many signs, and that she herself was capable of producing them as well. Although several of the teachers approached her with a combination of speech and sign, she did not necessarily need the sign to

be able to understand them; she would just as often respond to a strictly verbal direction as she would a direction utilizing both the verbal and visual cues. Despite these receptive language capabilities, however, she seemed to rely heavily upon sign to indicate her needs and desires.

This child was observed to approach adults with sign differently depending on the adults' familiarity with sign. When approaching adults who could understand sign, she utilized actual signs to represent things that she wanted or to respond affirmatively to their questions. Because these were the adults that utilized signs with her, it seemed as though she knew they would understand her approaches. When approaching other adults, this child would physically point out the objects she wanted or shake her head yes or no in response to their questions.

In one particular instance, this child was knocked over by another child during a group dancing activity. Unfortunately, she hit her head on the hard floor and immediately began to cry. As she was crying, she repeated the sign for "Dad" over and over again. The teacher who initially comforted her did not understand the sign and tried to reassure her by making comforting sounds, holding her, rubbing her back, etc. These efforts did not seem to lessen her level of distress. Her crying remained constant and she continued to sign "Dad." When a different teacher saw her signs, she approached the child and talked to her about her dad. She said things like, "I know that you want your Papa, but he will be here very soon. Everything will be OK." Although her crying did not completely abate, its intensity did seem to lessen.

Child 6.

This child's verbal skills were extremely limited, and though at the time of observation he was beginning to make limited vocalizations, he continued to rely very heavily on other non-verbal means of communication. Diagnosed with Klinefelter's syndrome, this child had difficulties in other developmental domains as well. As part of an inclusive classroom, the teachers were very deliberate in their use and support of his signing in the classroom. They consciously attempted to promote sign by using it when they spoke to him, asking him questions

designed to elicit signed responses and including it as part of the overall classroom culture and curriculum.

This child was observed during lunch and during an outdoor play session. During lunch, the child was seated at a table with two peers. He had one of the teachers sitting directly next to him. When it was time to give out seconds, the teacher asked the child if he wanted "more" chicken nuggets or if he was "all done" with the chicken nuggets. During the exchange, the teacher got down to the child's level, emphasized and accentuated the words "more" and "all done," and incorporated the respective signs. In response, the child signed "more" in his own unique way, but immediately followed it with his sign for "all done." These signs, while very close to the actual ASL signs for the words, would have been difficult to recognize had the child used them spontaneously; had one not seen the context yet observed the sign, he or she would most likely not been able to recognize the sign. Had he or she immediately been informed of what the child meant, however, he or she would realize the similarities.

The child repeated this sequence several times. Finally, the teacher, approached the child in a similar fashion (i.e. at his level, emphasizing words, etc.), and said to him: "You're telling me that you want *more* and you're telling me you are *all done*. I can't tell what you want. What do you want to tell me? Do you want *more*? Or are you *all done*"? Eventually the child indicated that he really wanted more chicken nuggets.

While on the playground, the children mainly wandered around alone. Occasionally, other children would engage with him briefly, though their play was more parallel than cooperative in nature. Towards the end of the outdoor play period, the child approached another child's parent who was talking to one of the teachers. As he approached her, he signed his version of "play." At first, the parent did not seem understand what he was trying to communicate to her; she stared at him quizzically. After he repeated the sign and continued to approach her, she eventually understood his intentions and asked him if he wanted to play. He

then picked up a nearby ball and threw it towards her. The two of them continued throwing and fielding the ball together.

Child 7.
This child was also observed over the course of a week in an inclusive, preschool camp setting. Although this child definitely understood and utilized spoken language, he was very easily overwhelmed due to the effects of Fetal Alcohol Syndrome. To limit his distress, one needed to utilize clear, simple and direct language. Particularly when giving him directions, it seemed helpful for the adult issuing the instructions to give him a choice within those instructions. For example, when the teacher tried to help him transition to group time, she could not direct him simply to sit on the carpet; the carpet was too large, and the direction could have too many meanings. When a teacher was observed to utilize this approach, he became distraught, screamed and scratched her. Yet, when the teacher simply said "Chair? or Z[2]?" and combined these choices with their respective signs, he was able to calmly choose a place to sit. After being presented with the choices, the child signed and spoke "chair," sat down in the chair and was able to listen to the story at group.

Summary.
The verbal abilities and primary uses of sign varied amongst the observed children. Some children were observed to use sign as a primary means of communicating with adults. For other children, signing seemed to be more of a secondary option. They used it to reinforce their verbal approaches or as a means of negotiating. Still others used it to help communicate when too upset to do so verbally. Additionally, for many children, sign seemed to help supplement their understanding or responsiveness to adult instructions. While some of the children had fine motor difficulties impeding their accurate production of the sign, given the right context and information, their signs were understandable. In spite of the variance in their uses of sign and the

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[2] The carpet that the children sat upon was an alphabet carpet that contained squares with each of the letters. By asking if the child wanted to sit in that particular spot, teachers were limiting the choice to a much more manageable and organized space,

contexts in which these children utilized sign, signing seemed to give each of these children a

certain power and security; it allowed them to communicate their needs, interact with adults, and

express emotions.

Discussion

Child Uses of Sign and Interpretations

Based upon the observations and interviews described previously, many different types of

children seem to benefit from using sign. Although the specific benefits will naturally vary from

situation to situation, within the context of this study, overlap existed in the ways in which the children benefitted from utilizing the signs. During the observations, children were observed to utilize sign as a transitional tool to verbal language, as a means of self-regulation and as a means of developing self-efficacy and attachment. Echoing these observations, parent and teacher interview responses also affirmed these uses of sign.

In addition to highlighting the patterns of potential signing benefits and utilizations, these observations and interviews also revealed a common pattern of challenges facing the effective use of these sign-based supports. Results from both the interviews and observations indicated that successful sign-based supports often required extensive familiarity with the child and his or her unique way of signing as well as a solid investment of parent's and teacher's time. Yet, these challenges seem to provide the basis for the emotional applications of the utilization of sign; they seem to promote the foundations for the development of self-regulation, self-efficacy and attachment.

Challenges.
Nevertheless, the amount of effort and time required for the success of these sign-based language supports can be prohibitive, especially when classroom and/or family settings are not structured to promote and/or support such investments. Both parents and teachers may lack the resources and/or time to become familiar with sign. They may also have difficulties understanding the children's unique way of signing, particularly in the beginning. These comprehension difficulties could lead to increased levels of frustration for both the child and his or her caregivers.

Overall, these potential challenges indicate that the relative success of sign-based language supports is guided by the contexts in which they are applied. Yet, beyond the particular conduciveness of the environment, the particular temperaments, diagnoses and/or abilities of certain children may dictate the appropriateness of these supports. Thus, more specifically, the

overall appropriateness of sign-based language supports is dependent upon both the context in which they are applied and the overall temperament/abilities of the child in need of support.

Context Factors.

When evaluating an environment's appropriateness for sign-based language supports, it is important to note the unique and essential elements of the two environments with regards to this study that contributed to sign's overall success. Firstly, the two contexts described in this study explicitly valued and prioritized inclusion. This commitment to inclusion was key because it implied that the people responsible for the child's care were committed to doing whatever necessary to ensure that each child was able to function optimally in the environment. It was this commitment that ensured adults were able to sustain the level of attention and invest the necessary amount of time to gain familiarity with the child and ensure the overall effectiveness of the support. If a context does not ascribe to this same philosophy and commit to this level of support, sign based language programs will not be as effective or successful.

Furthermore, both of the contexts had staff that were either already familiar with or had access to resources for learning sign. Not all environments have the time, money or resources to ensure that caregivers and children have the opportunities to become familiar with sign. Although environmental factors can contribute significantly to the overall effectiveness and appropriateness of sign-based language supports, they are not the only factors that should be considered when contemplating sign as a potential tool for a child with limited verbal language skills. Because the success of sign-based supports is often mediated by the suitability of the environment and the child as well as the interactions between the two, it is vital that one consider the child-based factors that can contribute to this success as well.

Child Factors.

Most importantly, in order for sign-based language supports to be effective, a child must have an interest, not only in simply communicating, but also specifically in signing. If a child

does not have any interest in learning or using sign, it will not be a useful or appropriate tool. Although the child's caregivers and/or environment may promote and encourage his or her use of sign, if the child lacks the intrinsic motivation for its use, he or she will not find it a beneficial means of communication.

Conversely, sign based language supports seem to be particularly useful for children who are drawn to sign. Within the contexts of this study, Child 1 and Child 2's use of sign seemed to clearly illustrate this idea. Although both of these children had spoken language abilities, they *chose* to use sign in order to support the areas where their language was not as developed. It was this choice that made signing so successful and powerful for each of these individuals. In situations where they were unable to communicate verbally or felt incapable of communicating verbally, having the option to sign allowed these children to access a means of communication that was within their control. Had sign not been an intrinsically motivated choice, but rather something adults required or pushed them to use, the sense of control and power that they sustained from using sign would have been lost, and their use of language within these contexts would have continued to remain unsupported.

Yet other child-based factors have the potential to influence the relative appropriateness of sign for each individual. Many parents and teachers interviewed indicated that several of the children with whom they worked also had co-morbid fine motor delays. These fine motor delays made it difficult for the children to accurately produce certain signs. Consequently, these inaccuracies made it difficult for adults, at least initially, to recognize and distinguish the children's intended signs. Although teachers and parents indicated that they were able to observe a pattern overtime and eventually understand and recognize these children's unique signs, if the individual child is easily frustrated, the amount of time it takes adults to learn his or her unique way of signing may simply discourage the child.

Finally, when supplementing a child's language using any program or tool, it is essential that the program or support increases his or her opportunities for communication and social access. In the interviews, one of the number one concerns parents and teachers expressed regarding sign and its use with children with special need was its potential to limit the child's development of spoken language, making the child's ability to communicate very contextualized. Although this phenomenon was not observed within the contexts of this study, it is important to understand and acknowledge this concern. Because there is a limited knowledge and understanding of sign within the general population, in order for children to have access to this population it is important that they have some way to access spoken language whether it is self-produced or produced via an interpreter or assistive speech device. Thus, when introducing sign as a potential communicative tool for children with special needs, it is important that the child in question has the capacity to be flexible with their understanding and use of language and realize that sign is not an end, but rather a means to an end. Because sign seems most effective as a transitional tool to greater language abilities, other language supports may be more appropriate for a child who has very rigid behaviors and patterns of thinking and may not be able to support this level of flexibility and change.

Transitional Tool to Verbal Language.

For children who are without initial access to verbal language, signing can provide a baseline tool for expressive communication. It seems to help bridge the gap between children's expressive and receptive language abilities, providing them with the opportunity to engage with the world and prove their understanding. It allows children to assert autonomy and indicate their own needs, desires and preferences. Having these initial opportunities to assert autonomy, at least in predominately western, individualistic cultures, is imperative for optimal social and emotional development.

Without expressive language abilities, children do not necessarily have the opportunity to indicate preferences and opinions. Verbal expressions make a child's indications clear. Without this clarity, adults must interpret from the context a child's needs or wants. These less clear cues and signals leave room for the misinterpretation and misperception of a child's actual intentions. Additionally, it gives the child less of a sense of individuality and separation from the adult, as the adult gives the child his or her intentions. Yet, individuality and independence are highly valued in current western culture. Children are expected to develop their own motivations, desires and interests.

Without the verbal language basis to promote opportunities for using communication as a means of self-assertion, children with expressive language difficulties are put at a disadvantage in terms of development of autonomy. By giving a child with special needs access to sign, however, one increases the child's potential to effectively communicate his or her individual needs. It gives the child a temporary means of expressive language, giving him or her earlier access to independent expression. Theoretically, this increase in potential communication and opportunities for self-assertion can potentially improve the child's outcomes in regards to his or her development of autonomy.

For instance, without sign, the teacher observed interacting with child 6 would not have been able to determine whether or not he wanted more chicken nuggets. She would have had to rely on less direct methods of determining his preferences, methods much more subjective to her perceptions of the child and his actions. Sign allowed him to be clear with his intent. He wanted more chicken nuggets. This indication and clarity is not something with which his peers struggled. They had the verbal capabilities to express themselves. Without the verbal capabilities to communicate basic needs, the child was differentiated from his peers. Sign allowed this child to compensate for his verbal difficulties, potentially preventing their impact on other areas of his development.

In that same sense, Parent 2 indicated that her child's delays in expressive language could have been incredibly limiting. Her child was very interested in learning about the world and had the capabilities of doing so, yet she lacked the expressive skills to demonstrate it. Sign enabled this child to demonstrate her understanding to her caregivers, and in turn, they gained a better understanding of what she needed in terms of enrichment. It gave her access to communication, so that, in spite of her verbal difficulties, she could continue to progress in other realms.

What also seemed particularly interesting was the ways in which all of the teachers perceived this transitional use of language as a means of demonstrating the flexibility and power of self-expression. When asked what they found most beneficial about the use of sign, every teacher indicated some variation of finding sign to be helpful in showing children that there are multiple ways of communicating, and that there is no one "correct" way to do so. Every person has both the capacity and right to express themselves, and in these teachers' experiences, sign has been instrumental in demonstrating this concept to both children and adults.

Mirroring these teachers' perspectives, Parents 1 and 2 indicated similar sentiments in regards to sign. They described how sign provided vehicles through which their children were able to initially "find a voice" and demonstrate their interest and abilities in communicating with others. In the lives of their children, sign provided a vehicle through which they could indicate or initiate communicating their needs, interests and desires; it gave their children the same basic opportunities for self-expression and autonomy inherent to children following typical developmental trajectories. By establishing and ensuring a baseline of equality in regards to opportunities of self-expression, signing can be particularly powerful for children with special needs. This foundation of access to self-expression can promote further development of a child's autonomy and independence.

Self-Regulation.

Over the course of the observations and interviews, a surprising application of sign began to emerge. Certain children seemed to use sign as a regulatory tool. It helped them find comfort in situations where they were hurt or upset.

Specifically when faced with a situation where she was hurt, Child 5 used sign to indicate that she wanted her father. Although the initial caregiver attempted to comfort the child, the child's indications of distress did not diminish until a second caregiver responded specifically to her sign. Her crying did not lessen until the caregiver acknowledged that she wanted her father. It is possible, that the child's lessening distress and the second caregiver's response to her sign was coincidental, as children tend to calm over time. At the same time, however, one must question the role that sign played when the child was hurt. It is very interesting that the child who was already beginning to experiment with verbal language immediately used sign in a time of distress. Something about sign must have been more comforting.

Child 2 was observed using sign to communicate with a teacher his feelings and perceptions of a prior incident involving Legos. Due to the intensity of his distress, he was incapable of approaching the situation without such emotionality. The extent to which he was experiencing these emotions was out of his control. Furthermore, his role as a child within the dynamics of the teacher/student relationship inherently limited his opportunity for control. He had no choice but to confront the situation and interact with the teacher. Yet, having the option to sign gave the child a means of controlling the dynamic of the interaction. Although there were many aspects of the situation that he could not control, choosing sign and hence, choosing the manner in which he responded, gave him partial control of situation.

Recent research has shown that general language development and the development of regulation have a strong connection (Cole, Armstrong & Pemberton, 2010). In their chapter on the role of language development in the development of emotion regulation, Cole et. al. (2010) discuss how language can help children label emotions and serve as a guide for problem solving.

This use of language (i.e. as a guide for problem solving), labeled by the researchers as "private speech," seems particularly important within the context of the development of regulation. It seems to serve as a means of distraction from negative emotions when faced with challenging situations or situations where children have little control. It makes sense, then, that especially when acting as a transitional language sign can play similar roles in a child's development of regulation. What makes it powerful, however, is sign's potential to extend this "typical" aspect of development to a larger population of children.

Self-efficacy.
In many of the situations, utilizing sign seemed to give children almost a sense of security and control. For instance, Child 1 utilized sign to negotiate with the teacher about his consumption of snack. Due to health concerns, this child needs to eat and has little control over the amount of food he consumes. At the same time, however, he is at a point in development where he is beginning to increase his independence and autonomy. He wants to have more of a sense of control and power, yet is faced with a situation where he inherently has little power. Using sign in this situation allowed him to communicate his own preferences and desires. In spite of having the capabilities to navigate the same situation verbally, he chose to use the sign. This choice implies that, at least for this child, signing provides a greater sense of power or security than verbalization alone.

In her interview, Teacher 5 indicated similar experiences with children using sign in this manner. In her experiences, sign was able to help a child who felt shy and intimidated by the classroom environment, gain a better sense of security. This child was capable of verbal communication but lacked the security to do so in a situation where he felt out of control and overwhelmed. Signing allowed him to better navigate the discomfort. It was somehow less threatening than verbal communication.

In order to fully navigate and thrive in today's society, it is important that children develop the confidence to communicate. For full participation in society, children must learn to adapt to environments and be comfortable in multiple situations. So that everyone has equal opportunities for success, it is important to find strategies to help children who have difficulties developing this confidence. Based upon these two children's experiences, sign seems to have the potential to be one of these strategies; it can somehow make communication more secure and within the realms of the child's control.

Early childhood and preschool settings can give children a sense of powerlessness, as each child is expected to conform to the schedule of the entire group. Children in this setting have very little control over when, where or how long they play, eat, sleep, etc. They must adapt their own habits to those of the group. These expectations can be difficult for even "typically" developing children, children who know that they can reliably communicate their needs and feelings to adults. For children who already have difficulties relaying this type of information, these situations can be that much more overwhelming. If signs can give these children at least some sense of self-empowerment, perhaps, they can be utilized to foster an easier transition and adaptation to the school environment.

Yet, what is it about sign that can make children feel more secure and comfortable? Is there are particular message that giving a child access to sign sends to the child? Is there some sort of implicit indication of the adult's commitment to the child through this access? Within the context of this study, having access to sign seems to signify to children that their thoughts, opinions and feelings are important, and that their caregivers want to understand them. Most importantly, however, it also seems to demonstrate that they have control over the ways in which they express themselves, and that this expression is powerful.

Attachment.

Throughout all of the interviews and observations, the success of the sign-based support seemed contingent upon both the adults' efforts to promote sign and the adults' knowledge of the child. In order for a child to have total access to this support, an adult had to invest time teaching the sign to the child, and in turn, time learning the individual ways that a child used the sign to communicate. This investment implies to the child that that their unique thoughts, needs and desires are important to adults. It shows them that they are regarded and respected as people; it shows them that they matter.

Perhaps, it is this basic demonstration that makes sign so potentially powerful. By promoting a basis of security and trust within the contexts of the child's relationships with adults, sign taps into the very nature of human attachment. As defined by Bowlby (1988), attachment and specifically the attachment relationship provide a base from which children can explore and learn about the world. An ideal or "secure base" gives children the confidence to take the risks necessary for development by providing them with a stable place to which to return (Bowlby, 1988). Although there are many questions in regards to the nature of the applications attachment, it is generally accepted that attachment and specifically secure attachment, have important implications for a child's overall social and emotional development (Haith & Benson, 2008). If sign can help strengthen attachment in children, it can potentially help promote the development of self-regulation, emotional stability and relationships.

Conclusions.

In children with special needs, sign appears to have many potential positive applications for development. What seems to be particularly salient, however, is its unique ability to potentially help children with delays in expressive language compensate in other aspects of development. Due to the nature of the use of language in terms of social and emotional development, delays in language can inhibit progression in these areas of development as well.

Sign seems to have the potential to help lessen the possible negative extensions of language difficulties and give a child a better chance of accessing the "typical" social and emotional developmental trajectory of his or her peers. Children with special needs should have the same opportunities to flourish as their peers. While there are multiple approaches to promoting this access and sign may not be appropriate for every child, for some children sign could be a beneficial tool. For these children, sign seems to potentially act as an equalizer, lessening the limitations of their disabilities and empowering them.

Limitations

The limitations of this study stem primarily from its incredibly varied sample, its interpretive nature and its relatively small sample size. Although the variance in the sample did allow for a rich variety of examples and seems to speak to the potential broad-ranging populations for which signing could be relevant, the lack of continuity and unifying characteristics across subjects also indicates a weakness in the overall sample. Despite the similarities within the results, it is very difficult to make reliable comparisons with subjects of such different age ranges, diagnoses, primary uses of sign, etc. In addition to being incredibly varied, the sample size was also relatively small. Although the sample size seemed appropriate for the scale of this study, it is difficult to determine whether or not one would see similar results amongst the larger population as a whole. Furthermore, it is unclear as to whether or not this sample is representative demographically of the larger population.

Other limitations of this study stem from its interpretive and qualitative nature. Although interpretive and qualitative research methods are well regarded and accepted across a variety of fields, interpretive research is much harder to quantify and objectify. The very essence of interpretive research relishes and cherishes the perspectives that most "hard scientists" dismiss as biases. Qualitative perspectives embrace the researchers' and participants' inherent perceptions

and seek to explicate these implicit viewpoints. While these viewpoints are inherent to the human experience, they cloud objectivity. In this particular study, potential biases stem from the researcher's role as participant observer, the subjective measure of the coding categories, and the results' nature as interpretations of participant behaviors and responses.

Because the researcher had pre-established relationships with the participants, there is an inherent removal of objectivity. It would be impossible for her to completely remove the lens through which she already viewed these people. Additionally, because some of the observations were based not upon formal observations, but upon observations from encounters and interactions with participants, it is possible that the ways in which she approached said interactions were influenced by her own pre-conceptions.

Additionally, interpretive findings cannot always be neatly measured in a numeric way. This seems to be true for this particular study as there is no objective way of measuring the extent of the relationship between the signs and the attributes with which they were associated. Additionally, there is potential for subjectivity in the mere categorization and evaluation of the observations. The coding categories, though based upon patterns, are at best generalizations of the phenomenon. Although certain tendencies associated with sign were observed and indicated within the observations and interviews, these associations are inherently biased and subjective. As with all behavioral research, one can only document the behavior. The attributions made to these behaviors are merely interpretations. Interpretations are inherently subjective because they are influenced by the experiences and perceptions of the person making the interpretations.

Finally, and most importantly, it is possible that researcher bias impacted the nature of the results and interpretations of the study. Because the researcher had had previous, positive experiences with sign, and thus an overall belief and investment in the success of sign, it is possible that these preconceived notions influenced the way in which she approached the interviews, observations and analysis of the results. At the same time, however, it is important to

note that, in spite of these biases, she was conscious of these potential biases in her approach of the study and actively strove to remain objective during the data collection and analysis process.

Future Directions

Further research is needed to explore the potential relationship between increased emotional regulation and the use of signing in children with special needs. Based upon the results of this study, signing appears to have many potential benefits for children with special needs. The limitations of this study, however, make quantifying or measuring the extent of these benefits, particularly difficult. Perhaps, a more standardized and easily quantifiable understanding of the extent to which signing and emotional regulation are related can be obtained. Future studies comparing the level of emotional regulation abilities in a group of children utilizing sign and a group of children matched for age, gender, diagnosis, etc. not using sign would be most beneficial for determining the existence of this relationship and/or the significance of that relationship should it exist.

Every child is unique. Development is a process and many tools have the potential to positively impact this process. Different tools will be appropriate for different children. While signing is just one of the tools that can be of use, children should have the opportunity to access it. Because sign does seem to have the potential to benefit certain children in terms of accessing appropriate opportunities for developmental growth, its use as a possible educational tool should be explored further.

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Appendix

Tables

Table 4: Coding Categories and Explanations.

Code Name	Description
Challenges	These are the things identified as difficulties facing the child, the teacher, the classroom or the parent when utilizing signing
Uses of Sign	This category encompasses the specific ways in which sign language is used either by the classroom, parent, teacher or child. Examples of this include the ways in which teachers and parents utilize it, the ways in which children with special needs utilize it, and the ways in which "typically" developing children utilize it to as well as the circumstances surrounding these uses

Social Implications	These are the observer's, teachers' and parents' notings of the child's use of sign to interact with peers. This category also indicates parents' and teachers' perceptions of the ways in which signing impacts both positively and negatively the social development of children with special needs.
Comfort with Sign	Within the context of the parent/teacher interviews, indicates the teacher's or parent's comfort level with using signs. Within the context of the observations, indicates the child's apparent comfort with sign.
Prior Experiences with Sign	An indication of the teacher or parent's past exposure to sign, including where/how they were first exposed to it and any experiences with it outside interactions with the child utilizing sign.
Opinions	This category encompasses both opinions of signing now, and hopes/wishes for how signing could be potentially used in the future. This has less to do with concrete experiences/examples and more to do with abstract ideas/thoughts about signing.
Environmental Factors Influencing Sign	This category addresses the ways in which the child's environment either promotes or does not promote to the use of sign. Includes concrete examples of how an environment may be either conducive or in-conducive to signing as well as hypothetical/general factors that could further promote signing

Table 5: Within-Case Data Reduction Chart Example.

Challenges
Interview 5
Devoting proper time
Logistical difficulties
General unfamiliarity with signing
Danger of it becoming too contextualized
Maintaining consistency
Not letting it interfere with peer interactions

Table 6: Across Case Data Reduction Chart Example.

Patterns of Teacher Challenges

Interview 1	Interview 2	Interview 4	Interview 3	Interview 5
Requires extensive familiarity with the child	Requires extensive familiarity with the child	Requires extensive familiarity with the child		
Children sometimes lack the fine motor skills necessary for accurate sign formation	Children sometimes lack the fine motor skills necessary for accurate sign formation	Children sometimes lack the fine motor skills necessary for accurate sign formation		
Adult unfamiliarity with vocabulary	Adult unfamiliarity with vocabulary and methods of incorporation			
	Requires a lot of initial support and adult facilitation—very time and labor intensive		Requires a lot of initial support and adult facilitation—very time and labor intensive	Requires a lot of initial support and adult facilitation—very time and labor intensive
	When children are not able to make themselves understood, they can become very frustrated	When children are not able to make themselves understood, they can become very frustrated		

	General Population is unfamiliar with sign—will sign actually promote access to others?			General Population is unfamiliar with sign—will sign actually promote access to others?
	Sometimes requires a "translator" to facilitate communication—negating the idea that sign allows children independent access to communication			Signing can become very contextualized requiring communication to go through a "translator," thus limiting the child's access to peers and hindering a child's potential for independent communication
		Sometimes logistically difficult to implement in the classroom		Sometimes logistically difficult to implement in the classroom
	Potential for children to only rely on sign, no motivation for further language development		Child and Environment must be capable of sustaining necessary attention—requires a deliberate "break in the routine" or a slowing down of the natural classroom pace	

Figures

Figure 1: Teacher Interview Guidelines

Can you please briefly describe your experiences with sign language in the classroom?

Prior to these experiences did you have any experience with sign language? If so, what made you decide to learn it? If not, how did you gain familiarity with it? Was it difficult to learn?

How did/do you personally use sign language? Any specific examples?

Do you find it helpful when communicating with this particular child/children? Any specific examples?

What difficulties have you come across personally when using sign language to communicate with him/her? Can you give any specific examples?

How does this particular child utilize the signs?

Do you think your classroom provides a good environment for a child who communicates using sign language? How do you think that he/she/them would function in another classroom?

How does/did the sign language affect this child/these children's social interactions with peers? With other adults? Any specific examples?

Are there any situations in which you have found the sign language particularly useful?

How do you think the sign language has influenced the child's language development?

Do you think it has led to improvements with speech? With social interactions? With language comprehension?

Are there any circumstances in which you think that the signs would not be useful?

Figure 2: Sample Teacher Interview Transcription.

PI: If you could describe any of the experiences that you have had with sign language in the classroom.

T3:   I guess my biggest experience was one of the years that we had someone who wasn't using as much verbal language, spoken language. So what we did was we incorporated it into especially groups that had a lot of auditory input, we would incorporate signing as much as we could, as well as a lot of visuals. So it was really supplemented a lot by using visuals, particularly for that child, but also to kind of get the classroom culture ready to accept and include someone who didn't have as much spoken language.

PI: Did you have any experience with sign language before that? I mean other than just J.C. coming in?

T3:   I didn't, so for me, it was learning right alongside kids. I was working with Corianne and Amy at the time, and they had both done at least a couple of years learning with J.C. and I think Amy taken a course in ASL at Tufts. So along with their help and the weekly sign meetings, we really incorporated it more into our classroom that year in particular, than in any other year.

PI: So, when you were using the signs with that child, what did you find was particularly helpful about it and how did that sort of play out with that child?

T3:   I think what was helpful, at least in my experience with kids who have a harder time communicating verbally, it's a lot about pro-social development. So trying to use signs as a way for them to engage with peers in a way that gives them access to what other kids can access with spoken language. So for me, I got to see how much it facilitated helping a child say "More" or "Do you want to play with me" and being able to really communicate effectively was one of the things I saw. The thing with kids who have any sort of issue around communication is that it peaks their frustration level too. So what we started to see was that this child didn't have as much access as other kids and was something that we could visually see was frustrating. So giving them the tools to really communicate effectively, even with just basic signs. Cuz like I said, I wasn't very scripted with ASL myself, but even incorporating basic signs or visuals that said kind of the same things that we were signing. "Will you play with me?" and we'd have a picture, like a board maker picture to go along with what we were signing gave this particular child a real opportunity to at least have a way to ask someone to play, or to play more, or all of the basic things that we wrote out in a way that gave him nice access to his peers.

PI: So and do you think the peers responded well to that? And even had they not had the formal stuff with J.C. and maybe hadn't seen you guys doing it as much, do you think that they would have responded to that? Or do you think it was just something that sort of happened in your environment?

T3:   I think because it was so much a part of our community that year, it really lent itself well to having kids be receptive to it, um but I would say across the board, even if we didn't have weekly meetings with J.C. it was so important to teachers and to this friend be included, I know that we would have made as much effort as we could to help kids really understand that this was not, that it was just another way to communicate. And we did have kids that were very patient and flexible about it, and really understood that this was the way that he was able to communicate and that was an important thing for us to be responding to as well. It was a few years ago, but I remember it just kind of became part of our classroom routine. And I think even if they didn't have weekly instruction with sign that how we were using it still would have been included in their day and their interactions with this child.

PI: So did you come across any difficulties when you were communicating with him? Or did he have any specific difficulties with the signs?

T3:   One of the biggest difficulties has to do with the attention. This was in the red group so the attention span of a 3 or 4 year old, everything happens so fast, so there's a very rapid pace with switching from activity to activity. So a lot of times it did take an adult

facilitating, stop, you know stop, look and listen, go through the given steps for this child to really engage and that part really took more scaffolding you know. especially in the beginning when we were trying to lay the groundwork for it, it took more time. So it is certainly more labor intensive for who, whichever teacher was facilitating, but. It did mean that we would have to like slow down the pace for the kids around him, cuz they like just move so fast, so that was definitely a challenge. Another challenge I guess with the child was same thing kind of, like straying a little bit from his agenda to be able to incorporate his sign. I think a lot of times what we were trying to do was because it hadn't been used very much prior to the year that he came to our classroom, was really having him recognize the power of sign. It was one of the first years that he was at a daycare center, so it was very new to him as well, so I think it took a lot of practice too with having to break his routine from the things he wanted to do, or the games he wanted to play with to kind of stop and do the same thing. You know, like "Look at the friend" "Here's a card, let's sign to them, 'do you want to play with me?'" that sort of thing. So I think for all kids, it was really labor intensive in the beginning with teachers to sort of set the groundwork, and then once we had the routine established, kids were more receptive to it and understood it more. And so did this child. But I mean there were definitely challenges, it was not easy by any means in the beginning, but I think that was because everyone was becoming accustomed to this new way to kind of "infuse" this communication.

PI: And I guess maybe outside the daycare center and unto the world, like "real world" I know a lot of people have expressed concerns with like there's not a whole lot of people who really have knowledge of ASL within sort of the community. So if you have a child who is relying on the signs as his or her means of communication, what do you think that could lead to more frustration? Or do you think it just sort of it's still better to have some form of communication than none? Or

T3: I certainly, I really feel as though it's really powerful and important for them to have that communication, even if the second they leave this zone, this center even if they do end up, unfortunately encountering a lot of people that don't have the ASL, I think, I watched as the year unfolded and really got to see a child who otherwise didn't have as effective or as powerful a way to communicate, really be able to open up and more engage, and really I think be willing to interact with peers because we helped him get the tools to do so. And I just think that you know for how long kids are here per day, but also just in general that that's a really big developmental step and milestone, to be able to feel like you can have your basic needs met. You know because he wasn't just communicating with peers. I think a lot of it had to do with asking teachers for something you know getting his basic needs met. I feel like that was a really salient experience for me. Was seeing that with the little tools we had that had to do with signing, that he was really able to have that become part of his experience at school. And I would say that, absolutely, myself included, there's not as much knowledge or it's not as big outside the TEDCC environment, but that while he was here, it was really crucial to his being a positive one.

PI: And do you think that it can often lead to often sort of other ways of communicating? Not necessarily spoken, but kind of different ways?

T3: I do. What we saw was first when this child first came to school a lot of his own agenda kind of self-directed play, kind of solitary play. And once he kind of had that base level of

communication. Once he was able to say do you want to play with me? Or can I have more? Or suggesting certain games which we had pictures for or signs for, we really started to see him sort of take on his own initiative in a way that hadn't been done sort of prior. So I think yes, that absolutely, it kind of opened that door for him to realize that he did have as much of a right and as much of an ability to communicate as much as the other kids in the classroom did. So, and the other nice thing that I can speak to examples of, is we started to see some sort of healthy testing, which we didn't really see happening before. So, I think with the ability to communicate we started to see some of the developmental steps like appropriate testing. You know taking things off the shelf that wasn't open and things that just didn't happen before. So, I think he started to gain some autonomy, but also just confidence that really lent itself to a different kid. Even say probably halfway through the year we started to see some real developmental milestones that he was making, and all of that was facilitated by having a way to really communicate more effectively. And, I'm trying to think of other examples of how you know concrete ways exactly, but absolutely, it opened doors in a big way. and I think even in just nonverbal communication increased a lot, even without the actual signing to a friend we saw more social referencing, more peer referencing, more eye contact, sustained levels of engagement with kids that I mean, One of the things that was universal was imitation. And we got to see a lot of that as well. So certain communication that really was increased through the signing.

PI: Do you think are there any, I guess this goes back a little bit to the other question, so how do you think the environment plays a factor into choosing why you would use signs or why sign might be as successful or not as successful

T3:   So the environment like the physical environment or the community of learners or

PI: I guess both, mostly sort of the people in the environment, the attitudes

T3:   I think many other situations that I can think of that have to do with inclusion or adaptive communication that it really came down to for us, making everyone's more positive. So you know we needed to have the child fit the class, I mean the classroom fit the child not the child fit the classroom. SO we were really, we came into the year prepared to try hard to do any sort of facilitation that we thought would be helpful. So I think that the environment part of it on our end as a teaching team was kind of a no brainer, like this is something that we really need to do to get ready to have this child in our classroom, and we had enough background information to know that we were really going to have to prepare ourselves for more visuals, and increased communication with signing and helping it just become part of our community. And I think because we were able to do that. And because we set up the environment that way, it was more conducive to a more robust experience for this kid. I mean I think it wasn't just that we used it only with this child, it was that we really tried to make a more concerted effort to make it more a part of the classroom culture. And for us, I think there's a lot of tools and things that have to do with communication for nonverbal children or partially nonverbal children that really kind of fit the whole group. And we got to see the benefits of having increased visuals in the classroom and really being able to understand I think that the kids when they left at the end of the year, that people communicate in different ways, but communication is so important and powerful. And some kids speak different languages at home and at school, and some children use communication like ASL if they don't have spoken language, and I

think that we got to see that children were really receptive to that as well. SO I think the environment was ready, and I think it played a big part because we really made an abrasive, strong commitment to it. But, and that being said, I think we were learning alongside a lot of the kids in our classroom that year and for a lot of us it wasn't necessarily a strength of ours but we tried hard to make him and the rest of the group really feel included and that this was a part of our classroom, not just this child's experience.

PI: Well, I guess that you've pretty much covered, it. I mean unless there is anything that you want to add or feel is important.

T3:   I think that I would add, that other than, For me, I am definitely still at a basic level, but I think just the power of that communication as a tool for the kids in the classroom is really important and I think that it is crucial to everyone's experience. I mean, one of the real reasons I, there is frustration around communication is that it is such a basic and fundamental part of every kid's experience and every kid's life whether it is at school or at home, but I think that really, to be able to help kids communicate and communicate their needs and create relationships is such a big part of that.

Figure 3: Parent Interview Guidelines.

How did you come to choose a signing approach for your child? Was it suggested to you? Was it chosen from a variety of options? Did you choose it in conjunction with another intervention?

Why did you choose this particular intervention as opposed to (or in conjunction with) other interventions?

When did you start this particular intervention?

What did the early stages of the intervention look like?

Did you learn the signs? Why or Why not? If so, How did you learn the signs?

In terms of this specific intervention, what kind of support have you received from your child's therapists?

When deciding on schools, what did you look for in terms of support for the signing intervention? Did you specifically look at schools that had accommodated children using signs in the past? Ones that provided ASL instruction?

How do you think that signing has impacted your child's social development? Do you think it has it helped him or her? Do you think it has limited him or her?

In what ways do you think it has helped or not helped your child? Can you give any specific examples?

Can you describe how you would use sign with your child on a typical day?

Would you recommend this system to other parents? Why or why not?

Do you find that most teachers are receptive to having your child in the classroom and utilizing the signs?

Are there any parts of signing that your child struggles with?

What about this intervention has been the most beneficial for your child?

Do you have any other thoughts that you would like to share?