

Effects of Iconicity on American Sign Language Acquisition and Retention: Supplementing Treatment of Communication Deficits in Children with Autism

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Seek first to understand, then to be understood. –Stephen Covey

The ability to communicate is a vital skill, for communication provides opportunities for individuals to make connections with others and to learn more about themselves and the world around them. Each interaction provides numerous opportunities for growth and development of ideas and individuals alike. Because of this, language is an important ingredient that forms much of the foundation of the human experience. Without a way to effectively and accurately communicate with others, an individual will experience much difficulty in trying to get his or her needs and wants across to others along with difficulties in understanding the messages and feelings of others, which, in turn, limits the individual's ability to respond appropriately and minimizes what the individual can gain from the interaction. It is easy to see how this type of situation would quickly degrade and lead to misunderstanding, being misunderstood, feelings of frustration, and even isolation.

Because of this, many people realize the importance of improving communication skills and make many attempts to do so. Unfortunately, acquisition of communication skills does not always occur at the rate that each communicator needs or wishes it to. Of course, this can occur in different situations with differing levels of significance. For individuals with communicative disorders this impact is typically much higher. These individuals have deficits in their ability to exchange information with each other, such as speech production problems (lisps, stuttering, or difficulty producing certain sounds), dysnomia (the difficulty or inability to retrieve the correct word from memory when needed,

as seen in people who have experienced brain trauma or with particular learning disabilities), and difficulties understanding language or the emotional, social, and pragmatic aspects of language (such as autism spectrum disorders).

The American Psychiatric Association states in the *Diagnostic and Statistical Manual of Mental Disorders-IV-Text Revision* (DSM-IV-TR) that impairments in communication are a key factor in determining if an individual is on the autism spectrum, along with impairments in social interaction and restricted, repetitive, and stereotyped patterns of behavior, interest, and activities, along with other factors (2000). These impairments in communication as defined by the DSM-IV-TR may be delayed (or total lack of) spoken language which is not accompanied by an attempt to compensate through alternative modes of communication (such as gesture); marked impairment in the ability to initiate or sustain a conversation with others; stereotyped and repetitive use of language or idiosyncratic language; and lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.

As soon as a child receives a diagnosis of autism, it is recommended that he or she be placed in an individualized therapy program to assist the child in improving the skill sets that are underdeveloped as well as maintaining each positive behavior the child already displays. Specialists believe it is important also to extinguish all maladaptive behaviors. In light of the social and communication deficits exhibited by those diagnosed to have autism spectrum disorders, it is crucial for these interventions to include attending and

language programs. The prognosis appears to be considerably more favorable for children with effective language skills at age five than for children who have failed to develop language by that time (Eisenberg, 1956). This suggests a crucial role for early intervention. In addition to communicative and attending programs, clinicians also include practice in imitation skills, play skills, gross and fine motor skills, and self-help skills. As a result of such intensive therapy, it is hoped that the child can enter into mainstream education with the skills needed to participate interactively and fully with his or her peers.

Even well-implemented teaching programs may still fall short by not producing the language component the family and clinicians desire. Current estimates suggest 30% to 40% of people with autism remain mute throughout their lifetime (Tager-Flusberg, Paul, & Lord 2005). Though it is not clear why this is the case, various strategies with an increased focus on communication practices utilizing “unspoken” language skills have become more prominent as clinical approaches to nonverbal children with autism. These strategies include “signing, gesturing, picture cards, or any other system meaningful to a child,” and have become increasingly prevalent since their initial successes in the late 1970s (Schopler & Mesibov, 1985, p. 7). Critics have cautioned that the use of these approaches may inhibit the development of verbal communication by reinforcing a behavior that is other than speech, but there are studies which suggest the contrary (to be discussed later).

If someone does not have a socially acceptable way to communicate, he or she will repeat behaviors that have been reinforced in the past (i.e. the child will partake in activities that typically bring about the desired outcome) even if these behaviors are physically or emotionally hazardous; this could include self-injurious behaviors (SIB), which typically become more severe as time progresses. Nor are severe behaviors the only maladaptive

behaviors to be concerned with. Behaviors like screaming, crying, laughing, grabbing, pulling and pushing, if they take place at inappropriate times or to achieve inappropriate goals, would also be considered maladaptive.

One of the largest growing topics of interest for those providing language therapy to children with autism is the use of American Sign Language or a form thereof (other sign systems that are not languages themselves such as Signing Exact English (SEE)—Appendix will include discussions of differences between the two), not only as a possible alternative communication system but also for promoting verbal language skills. It has been suggested that simultaneous communication training together with separate vocal training may be the best method for children with autism who are completely nonverbal, while simultaneous communication training may be enough for those who naturally possess good verbal imitation skills to further develop those skills (Carr, 1979). Another study, involving a four-and-a-half year old boy with autism who did not have spoken language skills, investigated three training strategies (total communication sign training, “sign alone” training, and “oral alone” training) and determined that the total communication model was “substantially superior to both the oral and sign-alone training models” (Barrera, Lobato-Barrera, and Sulzer-Azaroff 1980). In addition to research involving autistic children, other studies have examined the positive effects of learning a sign language on cognitive development in typically developing children (Caprici, Cattani, Rossini, & Volterra 1998).

ASL is the primary mode of communication for the majority of deaf and hard-of-hearing individuals in the United States and Canada, though estimates of such statistics are in need of updating (Mitchell, Young, Bachleda, & Karchmer 2006). ASL is a natural and complete language that has changed over the course of time and continues

to adapt to new demands and situations (such as the development of signs for the internet and President Obama). It has its own semantic and phonological structure along with its own syntax, pragmatics, and morphology that is produced through facial expressions, gestures, use of various hand shapes and different placements of those shapes in relation to the body, body placement, and the use of the space surrounding an individual to convey meaning. ASL can be used to express anything from simple and concrete ideas to those that are complex and abstract.

As there are words in spoken languages that combine to represent concepts, there are signs in ASL (this is not imply there is a one-to-one correlation from each spoken word to each sign, as each sign language is an independent language). Each sign can be described according to a number of features, including handshape(s) (some include more than one throughout the production of the sign), expression, movement (such as from the corner of the mouth to near the earlobe), placement (in relation to the body, such as near the forehead, chin, or shoulder), and orientation. Through utilizing the space around the person, head movement, and eye gaze, the signer can indicate and discuss a person or item that is not present, make comparisons between people or objects, indicate temporal occurrence, direction, perspective, and more. Though a person with severe communication disorders may not achieve elaborate or complete control over such devices, introducing a system with the foundation for such communication to occur is more desirable than one that does not foster further language and cognitive development.

There are other aspects of signs that are beyond the physical description of each sign. Each of these aspects may have an impact on the acquisition of each sign. Such aspects include the level of difficulty to produce, level of enjoyment, familiarity, similarity to other

signs, and iconicity. *Iconicity* is the measure of how much an item naturally resembles the item it signifies. Klima and Bellugi separated signs into three categories: transparent, translucent, and opaque. Some signs are highly iconic to the point that those who do not have knowledge about the structure of the language can deduce their meanings. These are called transparent signs. There are signs that people who are not proficient in ASL can understand the connection once they are given their meaning referred to as translucent signs. Most signs, however, are opaque signs, that are not often guessed by those who are not fluent in the language and are required to communicate clearly with other ASL users.

In this study, the researcher wishes to determine if iconicity has an impact on the acquisition (learning of signs) and retention (remembering learned signs over the course of time) of signs. The researcher expects that signs that are more iconic will be learned more quickly and retained more easily over time than those that are less or non-iconic. If this is the case, further studies should be done to find if similar differences exist in populations of individuals with communicative difficulties such as autism. There has been some suggestion that difficulty in understanding the correlation between words, objects, and concepts may lead to some of the difficulties for some individuals with autism in the acquisition of language (Grandin, p. 1285). Perhaps if an individual with such difficulties could more easily understand the connection between signs that are highly iconic and what they represent, it could provide the realization that is necessary to further develop language.

METHODS

Participants

The participants in this study will be several classes of elementary students at a few different schools in California's Central Valley. They will be in the first and second

grades, most likely in private school or summer camp settings. The children will be typically developing, with no experience with American Sign Language. The students who take part in the preparation stages will not be used in the experimental group.

Setting

All instruction will take place in the respective classroom of each group of students or in a common purpose room if the students are in a summer camp setting.

Materials

Preparation of Sign Lists: The researcher will create a video of several groups of related signs and present them to multiple groups of people: three classes of hearing second grade students (will be issued verbally), as many members of the Deaf community as possible, and at least three classes of college students (including an intermediate, college-level American Sign Language class). This video will show four presentations of the same sign. First each sign will be shown with the survey requesting the rater to guess the meaning of the sign. After the series is completed, there will be a repeated presentation of the first sign with the meaning of the word in written English (where the survey will ask the participant to rate the level of iconicity of the sign), another presentation of the same sign (asking the rater to state how difficult they consider the production of the sign while producing the sign themselves), the word in written English again, followed by the presentation of the sign for the final time (asking the rater to judge the level of enjoyment during the production of the sign). The information will not be directly linked to any individual, but demographic information will also be taken to compare any differences between the different groups that could have an impact on their ratings (age, whether hearing or Deaf, experience level with ASL). Drafts of each script and survey are in the appendix. Following the collection of the

surveys, two lists of signs will be compiled of equal standing in difficulty and level of enjoyment of the signs, with the independent variable being iconicity (highly iconic versus low or non-iconic). Any sign that is consistently correctly labeled as its meaning will be placed in the highly iconicity group. Any sign that is consistently mislabeled with something other than its meaning and/or consistently rated as lowly iconic will be placed in the low iconicity group. The data on each of the areas rated for each sign will be presented in a consolidated manner in the appendix.

Sign Language Lesson: The researcher will introduce herself and American Sign Language to the children according to the script provided in the appendix. Each class of second graders will be randomly assigned a group of signs to be taught to each of the students (if possible to have both high and low iconic signs for a same group—ex. Animals LOW and HIGH, things you do during the day LOW and HIGH, etc.). For each sign, the researcher will present the sign, voice its meaning, and ask the class to sign along with her. Each child will produce the sign. Two research assistants, who have been trained by the researcher, will assist in monitoring the students and prompting those who are having trouble imitating from the model presented to the entire class. After each of the signs on the first half of the list (highly iconic) have been taught (as many as possible in five minutes, probably three signs), the students will be lead in a game for five minutes that is unrelated to the teaching of signs. Any requests for information about the signs or what the sign is for different members of the group (i.e. wanting to practice the signs or learn the signs for other members of the same group such as other animal signs) will be redirected. If this occurs, the students will be informed that after I come back the following week to see what they remember I will be able to tell them what the signs are for other things. Following the

five minute break, the students will be taught the signs on the other half of the list. After this period of time, the class will review the signs with the researcher. Following this, the researcher and her assistants will assess which signs each of the children has learned by having the child produce the sign from memory or identify the meaning of the sign from a model presented by the evaluator. Each child's assessment will be randomly assigned as to which signs are being assessed from understanding versus producing the sign from memory. (A sample data sheet reflecting acquisition scores is included in the appendix.)

One week later, the researcher and her assistants will return to the school to assess the students' retention of the signs. The same type of data sheets will be used. The same aspects that the child was tested in before will be reassessed. That is, if Child 1 was tested in Comprehension of signs A, B, and Y and Production of C, X, and Z, the same test will be administered again and the data scored. This data will represent the students' retention scores.

SCRIPT ONE: DEVELOPING SIGN LISTS

For adults:

Today I will be showing you a video of various signs from American Sign Language. Each sign will be shown four times. The first time the sign is shown, write what you think that sign might represent. Please do not feel that you need to come up with the correct answer, just write what comes to mind. Many signs do not look anything like what they represent. The second time you see the sign, it will be presented with its meaning in written English. At that time, please rate the sign in the area of iconicity, that is, how much that particular sign looks like what it represents. The third time, produce the sign yourself along with the video and rate how difficult the sign is to produce. The fourth time, rate the sign in how fun it is to produce that sign. Do you have any questions before we get started? [*following administration of the survey:*] Thank you for your time in assisting me with my research project today. All answers are valuable and your time is greatly appreciated.

SCRIPT TWO: DEVELOPING SIGN LISTS

For children:

Today I would like to show you a video of different signs from American Sign Language. Each sign will be shown four times. The first time, I just want you to write what you guess the sign might mean. Don't feel like you have to get it right because some signs don't look anything like what they mean. The second time you see the sign, the video will tell you in English what the sign means. When you see that, tell me how much you think that sign looks like what it means by circling the number of how much it does or does not look like what it means on your paper. The third time, sign along with the video and then tell me how hard it is to make the sign. The fourth time, tell me how fun it is to make that sign. Do you have any questions before we begin? [*following administration of the survey:*] Thank you for helping me with my project. You guys have helped a lot!

SURVEY (ADULT VERSION)

Demographic Information

Age: _____ Gender: _____

Circle one: I am Deaf/H of H/hearing.

I have had _____ years of experience with American Sign Language.

Please rate each sign in the aspects listed in the order given. (Remember: Iconic means how much the sign looks like what it represents.)

SIGN 1

What do you think this sign means? _____

How iconic is this sign?

1	2	3	4	5
Not Iconic				Very Iconic

How difficult is this sign to produce?

1	2	3	4	5
Not Difficult				Very Difficult

How fun is this sign to produce?

1	2	3	4	5
Not Fun				Very Fun

SURVEY (CHILD VERSION)

Background Information

Age: _____ Circle one: Boy / Girl

Circle one: I am Deaf / Hard of Hearing / hearing.

Which one fits you best? Please underline it.

I do not know sign language at all.

I know a couple of words in sign language.

I know some sign language (five to ten words).

I know a lot of signs (over twenty).

I practice sign language very often (Deaf family member that you sign with often).

Tell me what you think about each sign on this video.

SIGN 1

What do you think this sign means? _____

Does this sign look like what it means?

1	2	3	4	5
Not At All	Very little	Kind Of	Yes, after I saw what it means	Yes

How hard is it to make this sign?

1	2	3	4	5
It's really easy	Pretty Easy	Not Easy or Hard	A Little Hard	Very Hard

How fun is it to make this sign?

1	2	3	4	5
Boring	A Little Boring	Not Boring or Fun	A Little Fun	Very Fun

American Sign Language Profile

40 handshapes (http://www.aslpro.com/lesson_plans/lessonplans/40_ASL_Handshapes.doc)

SCRIPT THREE: INSTRUCTION OF THE SIGNS

Hi, my name is Natalie and I'm working on a project for school. I have a couple of helpers with me that are going to help me teach you today. Their names are _____ and _____. I want to teach you a little bit about sign language. Some people don't hear and those people have a different language that uses their bodies instead of using their voices to talk so I will teach you guys some signs that the Deaf use to communicate. Today we'll be learning _____ (animal signs, job signs, daily activities, etc.).

The first sign we're going to learn is _____. Everyone do this. ("Good job!" "You got it!") What does this sign mean again? That's right _____.

The next sign we're going to learn is _____. Everyone copy me. ("Excellent!" "You got it!")

This means _____. Right!

Now we're going to learn _____. What does this sign mean? _____.

Right!

[Take a Break]

Next three signs in the fashion described above.

Let's go over all of the signs we learned today. (comprehension of all signs, followed by production of all signs, in random order)

Okay! Now we're going to see how much you guys have learned from our little lesson today. [Separate out students and evaluate] You are awesome! Thank you so much for helping me with my project today! I'll come back next week and visit you guys again. I'll teach you guys a game and any other signs you'd like to learn that we didn't get to today. Thanks again for your help!

DATA SHEET

Bobbie Brown

BB	Comprehends		Produces		Given Tiger, Cat and Turtle are the HI and Bear, Dog, and Rabbit are the LO
Sign	Y/N		Y/N		
Tiger		X			<p style="text-align: center;">Explaining the Data:</p> <p>The black rectangles indicate what kind of knowing was tested for the sign. (i.e. Child 1 was tested in Comprehension of Tiger, Cat, and Dog PLUS Production of Turtle, Bear, and Rabbit) The marks (X) are made in the column of either Yes or No meaning the child could or could not do what was tested. (i.e. Child 1 did NOT comprehend Tiger or Dog, but DID comprehend Cat. Child 1 could NOT produce Bear but COULD produce Turtle and Rabbit.)</p>
Cat	X				
Turtle			X		
Bear				X	
Dog		X			
Rabbit			X		

Alex Jacobs

AJ	Comprehends		Produces		Given Tiger, Cat, and Turtle are the HI and Bear, Dog, and Rabbit are the LO
Sign	Y/N		Y/N		
Turtle		X			<p style="text-align: center;">Explaining the Data:</p> <p>The black rectangles indicate what kind of knowing was tested for the sign. (i.e. Child 2 was tested in Comprehension of Turtle, Tiger, and Rabbit PLUS Production of Cat, Bear, and Dog) The marks (X) are made in the column of either Yes or No meaning the child could or could not do what was tested. (i.e. Child 2 did NOT comprehend Turtle or Rabbit, but DID comprehend Tiger. Child 2 could NOT produce Bear but COULD produce Cat and Dog.)</p>
Tiger	X				
Cat			X		
Bear				X	
Rabbit		X			
Dog			X		

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