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Gesture and Signing in Support of Expressive Language Development

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Introduction

For the past several months, I have been working as a long-term substitute paraprofessional in Secondary Community Occupational Real-Life Education (SCORE) rooms with children who have significant physical, cognitive, communicative, or emotional challenges. Several of the students I have worked with are nonverbal or have verbal abilities that are well below that of their typically developing peers, making communication with them tedious and often shallow at best. The teachers and paraprofessionals who work in the program are aware that I am a sign language interpreter and they would often ask me, "How do I sign 'juice'?" or, "How do I sign 'play'?" During a cooking class, a paraprofessional modeled the sign for "cookie," and the student eventually mimicked the sign back to her. The student did not produce the sign with the correct movement, but the location, palm orientation, and handshape were correct; it was an acceptable approximation which earned the student what she wanted: a cookie.

This interaction sparked my curiosity, and I began observing the student more closely. For the remainder of the day, she did use some speech and gestures to indicate she wanted something, but I could not tell from a casual observation what those few gestures and vocalizations meant. The only gesture I understood clearly was when she held herself (as if she would wet her pants) to indicate she needed to use the restroom. When the paraprofessional or teacher did not notice her gesture, she simply screeched until someone responded. Over the next several days, I made a point to observe this student more closely, and I noticed a significant amount of frustration in her lack of ability to communicate effectively. I wondered if teaching her basic signs for wants and needs could diminish her level of frustration with staff and peers and increase her understandability.

This wondering has led me to consider this project as part of the requirement for a teacher education research course. This project originated as a practitioner-oriented "teacher inquiry" that serves as a tool to "untangle some of the complexities that occur in the profession" (Dana & Yendol-Hoppey, 2014, p.6).

The purpose of this project is to explore the effects of basic signed and gestured language on overall expressive ability in the potentially nonverbal at-risk child. I therefore raise the following research questions:

- If students, identified at an early age as potentially nonverbal, are taught basic signs or gestures to facilitate expressive communication, how would that affect their overall ability to communicate?

- What role does etiology play in a student's ability to acquire signed or gestured language?

To answer these questions, I decided to locate nonverbal students, their parents, teachers, and speech therapists. I began by contacting early intervention programs, Child and Family Connections, and the local early childhood program. I also decided to post on social media, hoping to locate other families who may be willing to participate in my research. Child and Family Connections put me in contact with several speech language pathologists, eight of whom were willing to participate in my project. Three parents replied to my postings on social media, indicating they would participate. Lastly, I sent correspondence to the special education administrators in the district to see if I could observe any students (excluding students that are deaf and hard of hearing as their primary disability) who use signing as part of their communication. The district put me in contact with six special education teachers who permitted me to arrange a series of observations in their high school SCORE classrooms, middle school functional behavioral intervention (FBI) rooms, and FBI intensive classrooms.

Site and Participants

The high school SCORE classroom allowed me the opportunity to observe three nonverbal students during their regular school day for a series of three formal observations and several informal observations over a four-week period. SCORE is divided into three highly structured and supported self-contained classrooms. Each classroom houses seven to eight students, two to three paraprofessionals, and one teacher. During my observations, students attended vocational education, adapted gym, mathematics, daily calendar, and weather classes. Additionally, I interviewed two of the classroom teachers, the special education administrator, and some of the paraprofessionals who work with the students.

One of the middle school FBI programs I observed was housed in one classroom and was comprised of nine students: three students had no language delay, two were nonverbal, and four were significantly low in verbal ability. I arranged three formal observations over a two-week period during math, social language, and cooking classes. The FBI class was supported with three paraprofessionals and one classroom teacher. I was also able to interview the classroom teacher for this program.

The final location of my observations was another middle school FBI intensive program. This classroom was comprised of seven students (only five were present, however; two students were absent during my observations), two of whom were completely nonverbal and two with significant language delay. Due to the sensitive emotions and potentially violent behaviors of many of the students in the FBI intensive program, I limited my observations to only one day. This room was the most heavily supported site I observed, with four full-time paraprofessionals, a student teacher, and a classroom teacher. Calendar time and adapted gym were the only group instruction classes throughout the day. Most of the students' time was spent one on one with a

paraprofessional in separate cubicles working on separate learning goals. I was also fortunate to interview the classroom teacher in the intensive program.

Data Collection and Procedures

I decided to begin my data collection by seeking insight into the perspectives of all my participants through triangulation. Using multiple data sources can "enhance your inquiry as you gain different perspectives from different strategies" (Dana & Yendol-Hoppey, 2014, p. 134). With this group of nonverbal students, I decided the strongest evidence I could gather to help determine the effects of signing and gesturing on their expressive language development, and to help me determine if etiology played a factor in their ability to acquire signed language, would be through their observable daily actions. Personal interviews with classroom teachers helped to inform me of details related to language use, social interactions, and gesture meanings. Due to strict privacy laws, I was not able to videotape or photograph my subjects' sign productions. Considering this, I meticulously detailed notes and sketches during my observations. I then photographed a model teen signer to recreate three of my subjects' sign productions. I compared those images with photographs of native child signers producing the same signs. I chose model signers who matched the developmental fine and gross motor age for each of my three noted subjects. The comparison photos are catalogued in Appendices A-E. These visual comparisons helped me to analyze how understandable each participant's signs were compared with native signers. Would these participants' signs be understood by others with knowledge of sign language?

Another form of data I included in my inquiry was a survey which I distributed to early intervention speech and behavioral therapists. I chose this method of collection because the information I was seeking from these educators was specific to early language development in nonverbal, at-risk children. I also knew I might stand a better chance of receiving anonymous responses from these busy professionals (whom I did not know personally), who might not otherwise have been able to make the time to meet for a personal interview.

The final method of data I included was interviews with three parents of children identified as at risk for nonverbal language as infants or toddlers, and who had been advised to introduce signed language during their early intervention years. The first child, whose mother I interviewed, was 30 months old and was still receiving early intervention signed support which had been initiated when she was 19 months old (social and speech support had been introduced at 9 months of age). My second interview was with the mother of an 8-year-old little boy who, at the time of our interview, had received early intervention signed support from 10 months to 36 months of age. The final participant was the mother of a 14-year-old high school freshman who had received early intervention signing support from 24 months to 36 months of age. I felt these families could offer their own unique perspectives on their children's experiences as they began to add signing support to their language development.

Literature Review

While searching for literature to investigate the topic of teaching signs or gestures to children with language deficit to advance expressive language ability, I found a somewhat sparse selection from which to choose. Although initially frustrated, I was quickly relieved to find some

studies with articles that were relevant to my topic. What I did find within those pages was quite exciting and universally suggestive of the need for further research. My selection of literature ranged in publication from 1997-2015, and the majority were small-scale studies involving between 4-69 participants. The following is a thematic analysis of literature related to the exploration of the effects of signing and gesturing on the developing language of nonverbal children.

Naturalistic Methodology

My initial wonderings began in the classroom where I frequently work as a substitute teacher in a multineeds setting with several students who have significant language deficit. While some students had been taught some formal signs, many had not. Regardless, they all employed some level of gesturing as an expressive skill. What also became apparent was that all the students in the classrooms where I work experience significant levels of frustration due to their lack of ability to express themselves and to be understood. For many of the students, moments of clarity came in the form of a gesture/vocal combination and often revealed themselves during casual interaction or play. This piqued my interest in the various methodologies of teaching nonverbal students signing and gesturing, and I sought out literature that experimented with teaching through play and in naturalistic settings. The etiologies of the participants in the literature I reviewed ranged from autism spectrum disorder to Down syndrome, with all participants sharing a significant deficit in expressive verbal language and between the ages of 17-36 months old. Various interventions were introduced, some focusing on gesturing, others on manually coded sign vocabulary, but all with the shared aim of increasing verbal communication and improving social interaction. Researchers Wong and Kwan's (2009) naturalistic approach incorporated eye contact and manually gestured vocabulary while simultaneously speaking with the corresponding verbal vocabulary. In several of the studies, researchers were mindful to limit the newly introduced signed vocabulary to only a few words at a time until the child displayed mastery before additional vocabulary was introduced. Researchers introduced toys of interest to each child with signs or gestures using a combination of eye contact and the verbal equivalent. If the child produced the word (either signed or spoken), they were praised, and in some studies received a small treat. The 17 children in Wong and Kwan's (2009) study were newly identified on the autism spectrum and were between the ages of 17-36 months. The similarities of Wong and Kwan's study and results to Wright, Kaiser, Reikowsky, Roberts, and Oetting's (2013) study of four children with Down syndrome were striking. Augmentative alternative communication (AAC) was identified in Wright et al.'s (2013) study as gesturing and sign language, and was used in combination with spoken language in a "context of play and everyday routines" (p. 995). Similarly, participants were between the ages of 23-29 months old. Results of both studies revealed that the interventions were effective in advancing communication skills and social interactions, and additionally, the parents of the autistic children in Wong and Kwan's (2009) study noted significant behavioral improvement at home (p. 685). Again, I considered the high school students in the classroom where I work. Would they also make the same language connections

For many of the students, moments of clarity came in the form of a gesture/vocal combination and often revealed themselves during casual interaction or play.

that the younger children in the literature I read made? Were they already making these connections informally on their own but without anyone to structure and interpret their gestures?

The next step was to focus on the "interpreter." Who would be able to interpret the self-taught gestures and signs these children developed, and who would teach them signed/vocal combined vocabulary?

Parent Participation

One of the interesting topics that surfaced during my literature analysis that I had not previously considered was how vital parent interaction was in each study I read. While some researchers encouraged parents to learn signs to interact with their children, such as Medeiros and Winsler (2014) and Wright et al. (2013), others, such as Dimitrova, Özçalışkan, and Adamson (2016), focused their research on the parent's ability to interpret their child's self-taught gestures and signs. In my own research project, I was limited in my knowledge of each child's personal history and how they developed their signs or gestures. What I was able to observe was their current level of functioning in the classroom.

Although the specific interventions in the literature differed, they all stressed the importance of parent participation in gesturing and/or signing. Interestingly, Wright et al. (2013) and Dimitrova et al. (2016) discussed the parents' abilities to interpret the children's gestures, but also noted that in the absence of gesturing, the parents have little to go on, which warrants consideration of alternative methods of augmentative communication.

Variations in Etiology

Although the children with Down syndrome demonstrated a high level of variability in cognitive and language functioning across participants, they shared general strengths such as a high rate of sign and gesture production compared to typically developing children (and in some cases, even higher than typically developing children) and a reliance on baby sign as well as an overall interest in social interaction. Children on the autism spectrum, however, displayed a general weakness in gesturing and in social engagement compared to typically developing children (Dimitrova et al., 2016). Regardless of the differences in these two groups' strengths and weaknesses, the intervention demonstrated language gains that were considered significant, with a key factor noted, that "…parents' translations of the gestures that children with autism, with Down syndrome, and typically developing children produced had similar positive effects on the subsequent vocabulary development of children in all three groups, a pattern shown previously only for typically developing children" (Dimitrova et al., 2016, p. 228). The role of parent as "interpreter" seemed to play a key role in this study.

Limitations to Sign and Gesture Acquisition

Seal and Bonvillian's (1997) study identified a limiting factor that became evident among a few of their subjects on the autism spectrum while they researched motor functioning in relation to manual sign acquisition. While most subjects thrived in their expressive language development during the intervention, four participants made little to no gain. Puzzled by their results, Seal and Bonvillian decided to test their subjects for apraxia and made a surprising discovery. The subjects who showed little to no advancement in their signing conversely scored very high on tests for apraxia. The conclusion Seal and Bonvillian drew from this was the importance of

testing autistic children prior to signing intervention. For those who test high for apraxia, alternative methods of augmentative communication should be explored early in their language development. While this discovery was significant to the 1997 study, the effect of apraxia on signing or gesturing was not mentioned in the Medeiros and Winsler (2014) study, nor was it mentioned in the Dimitrova et al. (2016) study.

Data Analysis and Interpretation

What Did I Observe?

On the first day of my observations in the high school, I spent some time just taking in the sights, sounds, and dynamics of the classroom. In the high school SCORE program, there are three classrooms (A, B, and C) with approximately eight students, three paraprofessionals, and a classroom teacher in each room. I was there to observe three nonverbal students in two different SCORE rooms (A and B). Two of the nonverbal students employed some gesturing and the occasional sign. The third student, however, was said to have had some instruction in what I will refer to as "baby sign" during early intervention. Formal American Sign Language (ASL) has its own complex language structure and includes the following components:

1. nonmanual markers
2. location
3. hand shape
4. palm orientation
5. movement

Unlike ASL, baby sign focuses on high-frequency words a young child would use, and is often signed in single words or a few words at a time in an English word order. Notably, nonmanual markers are rarely seen during baby sign unless signing occurs between a deaf child and native adult signer. Baby sign is often taught to babies around eight months of age or older to facilitate language development, and is sometimes taught during early intervention with children who are at risk for language delay. According to Hitzeman (2015), "Sign language can reduce frustration by allowing preverbal children a way to express their wants and needs. In two of the most common developmental delays, Down syndrome and Autism Spectrum Disorder" (para. 5.

Self-Created Gesture

The first subject I observed in SCORE Room A was a 17-year-old autistic male student I will refer to as Kevin. Kevin transitioned into the classroom and immediately walked to a computer where he quietly waited to type his daily schedule, while the rest of the class began a group lesson about the weather. For approximately 20 minutes, I saw no evidence of sign or gesturing from Kevin. Then he began "speaking" (quiet, unclear babbling) to himself and I saw his first sign. I recognized the sign as "bed." I changed my position so I could see Kevin's face and his work on the computer more clearly. Once I changed my view, I was able to understand Kevin's entire thought. He signed "bed," and used his voice to say, "Seep daa-ee ous." I translated this to, "Sleep Daddy's house." When I looked at what he had just completed typing, it said, "After school I will: Go Daddy house." For clarification, I asked, "Kevin, are you *sleeping* at Daddy's house tonight?" He replied verbally, "Yah!" I was intrigued that Kevin was one of the students who had not received any formal sign language training, yet his sign for "bed" was clearly

produced and easily understood. In Appendix A, Illustration 1, a model is recreating the exact sign production as Kevin. Because the sign for "bed" is iconic (the formation of the sign conveys the general meaning of the word), Kevin's signing was easily understood by even a nonsigner. In Appendix A, Illustration 2, a second model who is a deaf native child signer of comparable fine motor developmental age is producing the same sign. It is perceivable that Kevin created his own similar sign to represent the English word "sleep." In her study about the development of gesturing and pointing as a precursor to language development, Goldin-Meadow (2007) suggests that in the absence of language learning, children can create their own gestures and signs. Perhaps this vocal/sign combination was a strategy that Kevin employed to increase his understandability. As my observations of Kevin continued, I noted a similar pattern of iconic signs and vocalizations. During a second observation, Kevin was questioned by his teacher about Mom coming to watch him in his Special Olympics basketball game. He smiled in response and signed "basketball," then said, "Maa-ee smoochee," and signed a close approximation to the sign "kiss" (see Appendix A, Illustrations 5 and 6, 3 and 4). The teacher, who is familiar with Kevin's speech, said, "Mommy is going to give you smooches tomorrow at the basketball game?" Kevin grinned and verbally responded, "Yeah." Because Kevin's signs and gestures were iconic, people with no understanding of sign language would have been able to understand his basic meaning with only minor contextual clues, although with no advanced language structure or vocabulary, Kevin's comments were brief and lacked any depth or detail. I observed similarities in Kevin's signs when compared to a native signer's productions of the following words:

- basketball (Appendix A, Illustrations 5 and 6);
- bed (Appendix A, Illustrations 1 and 2);
- coat (Appendix A, Illustrations 7 and 8);
- backpack (Appendix A, Illustrations 9 and 10);
- kisses (Appendix A, Illustrations 3 and 4);
- ironing (Appendix A, Illustrations 11 and 12);
- drink (Appendix A, Illustrations 13 and 14); and
- lunch (Appendix A, Illustrations 15 and 16).

I also noted that Kevin's signs were primarily nouns with a few verbs and no adjectives or adverbs. Once I compared Kevin's signs to the model native signers, I was able to see how closely related the sign productions were. I finished my observations of Kevin wondering if he would be capable of learning new signs that were of higher language concepts rather than solely iconic signs, and if his autism would prevent him from acquiring those concepts. I also noted that Kevin, while using iconic signs in conjunction with vocalizations, did not make eye contact or initiate signed or spoken language with others.

Gesture as Precursor to Language

My next subject of observation in SCORE Room B was a 16-year-old female student with Down syndrome who I will refer to as Allie. According to her teachers, Allie had not received any formal signing during early intervention. Allie was most interesting to me because I could not identify any of her gestures or signs, and her use of them was sporadic and seemingly inconsistent. Allie did make frequent eye contact when spoken to directly, but I saw no evidence of verbalization during my formal observations. Allie did occasionally use deixis (pointing) as a strategy. I observed inconsistent head nodding and shaking for "yes" and "no" responses, and

pointing to picture cards when asked to answer questions about her schedule. By the third day of observations I was feeling disappointed that I would receive no tangible data from Allie, when I noticed an interesting moment between her and another student. During a gym class, Allie was upset as she had a hurt finger and it had been covered in a band-aid. Allie spent most of the class time sobbing about her finger, and holding the finger up to show that she was uncomfortable to a peer mentor who was comforting her. A curious fellow SCORE student came and sat with Allie and the peer mentor. The friend began gesturing to Allie with a concerned face and pointing to her tears. After class, the two girls went to lunch where I witnessed a barrage of gestures from Allie. She produced approximately 20 gestures, several of which she repeated numerous times, for a duration of approximately one minute. Allie's gestures were punctuated with highly expressive facial gesturing. I could not identify any of the gestures as iconic or find any meaning in the exchange other than she held her injured finger up for emphasis at the end of the gesture string. This made me consider the observation with Kevin in SCORE Room A the week before and the article about developing gestures and pointing in the absence of formal language acquisition. I wondered at that moment if Allie was trying to "baby babble" in gesture to tell the story of her injured finger to her friend, but simply lacked the vocabulary (signed or spoken) to relay what she wanted to say. I do not know if Allie's friend was able to comprehend the meaning of her gestures, but her friend remained engaged throughout the interaction and even mimicked Allie's facial expressions which I interpreted as a sign of empathy.

Multiple Strategy Communication

The final subject I observed in SCORE Room B was an 18-year-old female student with Down syndrome who was suspected by her teachers and speech language pathologist of having early intervention baby signing as part of her language development services. I will refer to this participant as Katie. Katie did not display functional expressive verbal language except for one high-frequency word, "yah." She did repeat the sound "ah" in a scratchy voice repeatedly. As I observed Katie, I noticed that she used a variety of strategies to communicate, primarily deixis, gesture, a few signs, and the verbal response "yah." Katie did not respond verbally with "no," but she did shake her head "no" when answering negatively. For the first class of the day, Katie worked one on one with a paraprofessional who redirected Katie when she was off task and demonstrated some hand-over-hand assistance when necessary. Katie did not display any spontaneous communication, verbal or gestured, when working on a fixed vocational task (matching travel toothbrush cases with tops and bottoms). When completed, she sat silently until the paraprofessional interacted with her. Their communication was primarily silly and repetitive. It was clear that this was a common exchange between them. The paraprofessional (who I will refer to as Miss K) would imitate Katie's voice ("ah") which would cause Katie to laugh. Another paraprofessional in the room commented, "Katie, I like your glasses." Katie replied by pointing to her glasses, then pointing to herself. Katie repeated this until Miss K finally voice *interpreted*, "Katie's new glasses." This concluded with a broad smile from Katie.

As the class ended, the students transitioned to a new activity and Katie walked past a group of tables where her friend was working. Katie stopped, made eye contact with her friend, and gestured "knock-knock" (in the air), then signed "stinky, two of us, later" (see Appendix B, Illustrations 1, 2, 3 and 4). Katie then looked at me and signed "hair, stinky, two of us, later." This exchange had me confused, as I was assuming her signs were iconic (stinky and hair). By the third day of my observation I realized that "hair" is a way Katie identifies different people.

For example, her favorite story book character is Dora the Explorer. She referred to Dora by signing "hair" (see Appendix B, Illustrations 5 and 6), then pointing to Dora's unique hairstyle and signing "book" (see Appendix B, Illustrations 7 and 8) and "monkey" (see Appendix B, Illustrations 9 and 10). Katie was also intrigued by my blond hair and was signing "hair" each time she would refer to me with someone else. The staff later told me that she loves blond hair. The sign "stinky" also had me confused because Katie would sign it with a smile and always when referring to a friend or something she liked. I came to interpret that sign as "I like." I began to wonder if this sign was originally derived from the ASL sign for "like." Illustrations 1 and 2 in Appendix B show the similarities in the hand shape of Katie's sign for "stinky" and the actual ASL sign for "like." Differences are noted in the location and movement. I question if, over time with no one to reinforce her signing skills, Katie simply forgot the correct location and movement, but maintained the handshape and palm orientation. As a sign language interpreter, it was not impossible for me to identify Katie's signs or gestures. Of the five components of sign language, Katie typically used at least two correct components, making her signs interpretable. Oftentimes her location and movement were incorrect, while her palm orientation and handshape were correct. Katie did not demonstrate any knowledge of nonmanual markers (NMS). Because much of Katie's time is spent with one-on-one paraprofessionals, I felt a paraprofessional with an interpreting background would be able to work with Katie's speech language pathologist to encourage, develop, and refine her language skills.

During my time in the SCORE rooms, I noticed another significant influence on Katie's language. When she interacted with her teacher, Miss T, I noted far more substance in her communications. Katie was able to answer direct questions through the use of gesture, sign, and her limited vocalization. Due to this shift in dynamics and focus from working with the paraprofessional to the teacher, I could assign more accurate meaning to Katie's signs, some of which she has assigned multiple meanings. Total signs/gestures that I observed and could identify included:

- cookie (Appendix B, Illustrations 11 and 12);
- thank you (Appendix B, Illustrations 13 and 14);
- hair (Appendix B, Illustrations 5 and 6);
- later;
- the two of us (Appendix B, Illustrations 3 and 4);
- I like (Appendix B, Illustrations 1 and 2);
- yes (Appendix B, Illustrations 15 and 16);
- no (Appendix B, Illustrations 17 and 18);
- book (Appendix B, Illustrations 7 and 8);
- hungry (Appendix B, Illustrations 19 and 20); and
- monkey (Appendix B, Illustrations 9 and 10).

Katie also produced some signs I could not assign a meaning to or identify. In addition, Katie used deixis in place of many proper names. For example, she would point to Miss K and sign, "Snack" (Appendix B, Illustrations 21 and 22). This was the name sign Katie made up for Miss K (who brings her a snack daily). The name sign Katie made for me was "deixis, hair, deixis." The paraprofessional would voice interpret that gesture string as "Miss L." Katie also used an augmentative communication device (ACD), a device similar to an electronic tablet that is

preprogrammed with high-frequency words categorized by different screens and labeled by icons the child can touch. The result is a spoken electronic voice that "speaks" each icon as the child touches them. Katie only used this tool occasionally when she was working on very familiar tasks such as the daily weather and counting, or as a reward during break time to play a game. I did not witness any spontaneous or narrative use of the ACD. Katie clearly sought out voice interpretation for her gestures and would repeat her gestures until someone would start voice interpreting. There were moments I knew the voice interpretation was simply silly and not actually relaying what Katie was trying to say. In these moments, Katie would become quiet and shift her eye gaze to a distant focus. I recognized this quiet isolation numerous times during my time in SCORE Room B.

I knew Katie could learn and use signs to advance her communication—I had witnessed that growth during my initial wondering while I was in the classroom as a substitute, prior to my formal observations. During a home economics lesson in baking, the students were learning to make cookies. A paraprofessional I will call Miss J asked me how to sign the word "cookie." I showed her the sign and then watched as she said and signed the word to Katie. Katie did not mimic the sign or say the word; she simply nodded her head. Miss J walked over to the tray of cookies and brought one back to Katie. She asked her, "Would you like a cookie? Show me the sign. You remember?" Katie signed an acceptable approximation of the sign with correct handshape, palm orientation, and location. The only deficit was in movement, but the sign was still clearly understood (Appendix B, Illustrations 11 and 12). I was impressed when I returned a week later: Miss J asked again if Katie wanted a cookie for snack, and this time Katie signed "cookie" without a prompt. The movement was still incorrect, but the meaning was clear. Katie was capable of learning, retaining, and expressing signs. Considering Katie has only one identifiable verbal word in her vocabulary, I felt that acquiring one new and clearly produced sign was a promising beginning.

Augmentative Communication

My research took an interesting turn as I began my observations in the middle school. Although I came to observe signing and gesturing, I decided to additionally observe the use of ACDs as I was told they were "replacing" the use of signing. I observed 10 different students with diminished verbal ability in two different middle school FBI programs. Nine of the 10 students I observed were assigned ACD's to facilitate their communication. I was initially told by the special education administrator I wouldn't have much luck observing signing or gesturing, because "none of the students really sign or gesture." I took my chances and was surprised at what I learned. To varying degrees, they all utilized some form of signing or gesturing.

The first FBI room I observed housed approximately eight students, with four semicircular tables with two students per table. Each station was led by a paraprofessional or classroom teacher and focused on different math skills. For example, one station focused on counting by 1s, 5s, and 10s, and another station was working on "dollar-up" problems. What struck me right away was the difference in responses between the high school and middle school students I observed. When the nonverbal middle school students were asked questions during their lessons, I noticed significant problems in their abilities to respond with the ACDs. After the first half hour of observation, I decided to open the timer on my cell phone. I started the timer the moment a question was asked and recorded the length of time before a response was generated on the

ACD. The response times varied. For repetitive counting questions, responses were usually only a few seconds. However, most questions resulted in response times of 7 seconds to over 2 minutes to generate. I realized that often someone would ask a question, and by the time the student had generated the response on the ACD, the person who asked the question had already moved on to another question, or called on a more verbal student with an immediate response. By contrast, all students who demonstrated signing or gesturing did so without delay. I noted an exchange between two students who I will refer to as Will and May. They used a combination of vocalizations, signs, and gestures to chat about Will's dad who had cooked dinner the night before. This was a spontaneous conversation; both children were laughing, comprehending one another, and generating questions. Once the paraprofessional sat down at their table, the spontaneous communication stopped, and the students went back to work trying to communicate with the ACD's. It was evident to me that with the ACD's, timeliness and spontaneity of language had become lost for these students.

The most poignant example of this was the student from the previous example who I referred to as Will. Will was a seventh-grade male student with Down syndrome. The paraprofessional at his table asked the students, "Did any of you hear that storm last night?" Will immediately looked up, made direct eye contact with the paraprofessional, and signed "thunder" (incorrect hand shape, but correct movement, location, and palm orientation), while voicing, "Moom" ("Boom") (see Appendix 12, Illustrations A and B). The paraprofessional did not know the sign for thunder, and I don't believe she understood that he was signing at all. The other students at the table were verbalizing about the storm, but Will's comment seemed to have been lost. He picked up his ACD at this point and began working to build a sentence. The other students and paraprofessional moved on in their conversation to discuss the weather outside. One minute and 43 seconds later, Will produced the sentence, "Weather is stormy rainy mishap." The paraprofessional replied, "No, Will, it's not storming out today. Look out the window. It is sunny." This observation illustrated to me the inherent problems with both the ACD and the lack of translation. Had someone understood Will's sign in the first place, he could have participated in the conversation as naturally as the verbal students.

I created Figure 1 below to illustrate the confusion and frustration I observed at that moment for Will as he tried to participate in a conversation with his peers and paraprofessional.

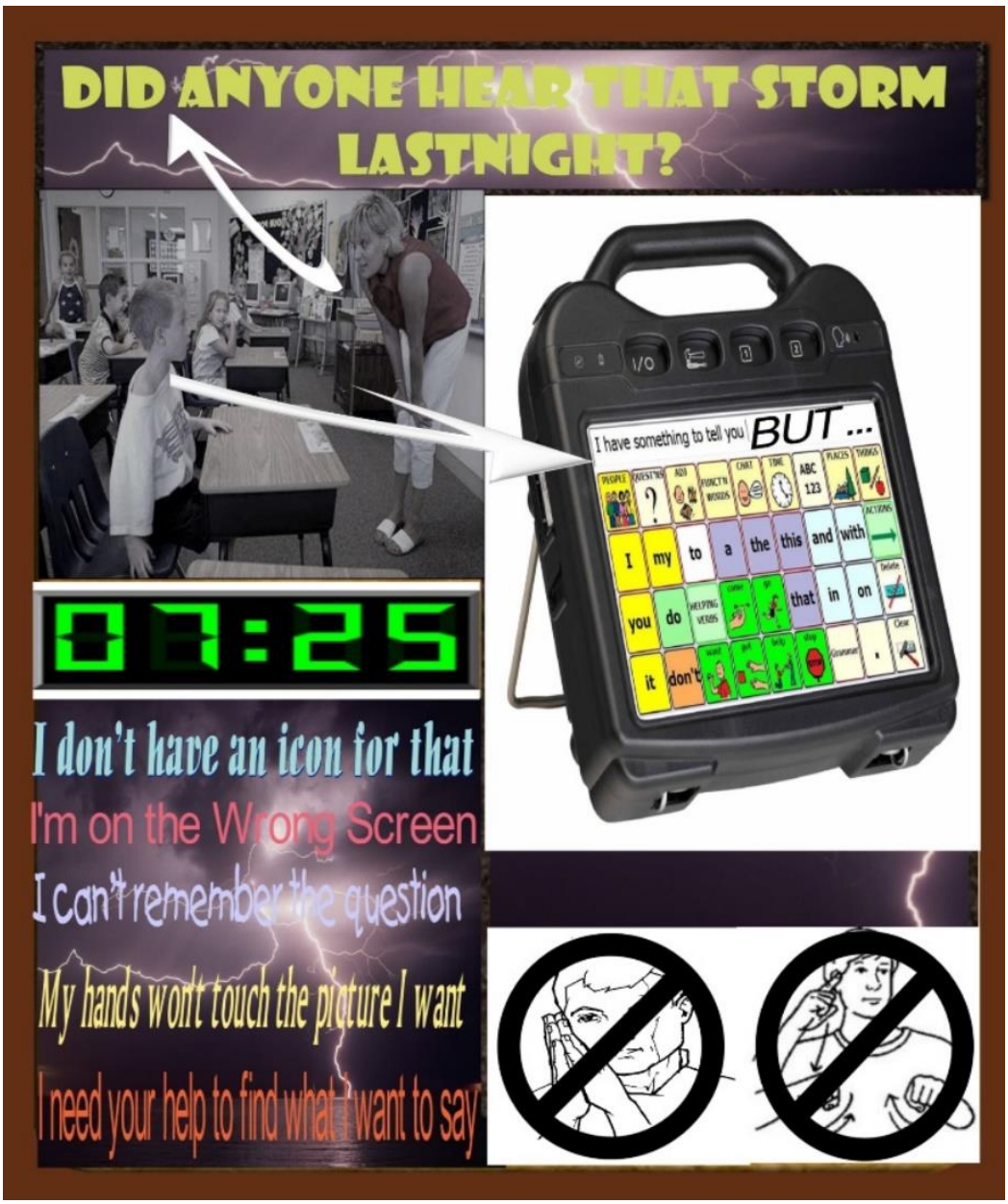

Figure 1. Visual representation of Will's thought process while attempting to engage in group conversation with peers and paraprofessional.

Since I had been told none of the students signed or gestured, I was surprised to observe the sign for "thunder." This is not a sign I would normally see in a baby signer. I continued watching Will and realized he had a large vocabulary of signs he used when he was not able to express himself verbally. When he did not have a spoken word or a sign, he was more likely to use signed classifiers (hand shapes that represent objects in ASL). For example, Will was questioned about

his lunch box before the students left for the cafeteria. He didn't know the sign and could not say the word, but he made a clear representation with classifiers to show the lunch box that he wore across his body like a shoulder bag (Appendix C, Illustrations 1 and 2). Will's sign vocabulary included the words:

- thank you (Appendix C, Illustrations 5 and 6);
- Dad (Appendix C, Illustrations 7 and 8);
- thunder (Appendix C, Illustrations 1 and 2);
- help (Appendix C, Illustrations 9 and 10);
- yes (Appendix C, Illustrations 11 and 12);
- no (Appendix C, Illustrations 13 and 14);
- ice cream (Appendix C, Illustrations 15 and 16);
- cherry (Appendix C, Illustrations 17 and 18);
- cook (Appendix C, Illustrations 19 and 20);
- eat (Appendix C, Illustrations 21 and 22);
- home (Appendix C, Illustrations 23 and 24); and
- lunch box (Appendix C, Illustrations 3 and 4).

I asked the classroom teacher about Will and learned that he in fact had received signing during early intervention, and that his family had been supportive and signed with him at home, but not consistently as his Mother had been gravely ill for the past year. In the middle school program, however, the teacher explained that the students were discouraged from using any signs because they wanted them to rely on the ACDs. This information was surprising to me, and I wondered about the consistency of language development for these students from early intervention through secondary instruction.

My observations continued between the two buildings over the next few weeks. I concluded that five students required constant attention to keep the ACDs on the correct screen. Comments I heard from paraprofessionals and teachers throughout my observations included, "You're not even in the right area," "Someone must have played with your settings," "I don't think we programmed an icon for that yet," and "Who touched your screen?"

I observed another participant, who I will call John, who had no formal sign language training. John was a seventh-grade student in the FBI class who was severely physically affected by cerebral palsy. Most of John's responses on the ACD took a minimum of 30 seconds, and at least 75% of his responses required one-on-one help due to his limited gross and fine motor control and severe vision loss. While I saw only limited gestures from John such as head nodding and head shaking for "yes" and "no" responses, I was surprised when he dropped his pencil, I picked it up and placed it on his desk, and instantly he signed "thank you" to me with the correct handshape, palm orientation, location, and movement. To generate "thank you" on his ACD (which I witnessed on another day of observation) required 27 seconds. Of 64 attempts to answer questions on his ACD, John required one-on-one assistance 48 times. Most commonly, the teacher or paraprofessional would cover most of the screen with their hands so that John would only have two or three icon options. Of the 48 times he required assistance, John was incorrect 33 times.

Although the ACDs seemed inappropriate and ineffective for five of the students I observed in both FBI and FBI intensive, I will add that the ACDs did seem to be an extremely appropriate communication tool for four other students. The most efficient users of the ACD were students who presented with fair to typical gross and fine motor control; students with higher cognition; and students who combined multicommunication strategies such as gesturing, signing, and vocalization.

Language Development in the Language-Delayed At-Risk Child

As I concluded my observations at the middle schools, I was perplexed with the introduction of a new and significant variable, the ACD. I began my research to answer the question of the effects of signing and gesturing on language development, but the introduction of an unforeseen mode of communication, as well as the intent of the staff to discourage the use of signing, rerouted my focus. I knew that several of the students I observed had received early intervention services where baby signs are taught to nonverbal children at the discretion of the speech and language pathologists (SLPs). In light of this, I made the decision to survey eight SLPs with early intervention services throughout Illinois. I would not be able to spend years following and studying my subjects from the time they were first identified as at risk for language delay. I could, however, speak to the SLPs about their current clients to give me some insight into what my high school and middle school participants' early years of language development may have been like.

I chose SLPs whose clients' etiologies closely resembled my SCORE and FBI subjects. Four of the early intervention subjects were diagnosed with Down syndrome, three with autism, and one with fetal alcohol syndrome and effects from premature birth. These children ranged in age from 19 to 36 months old. I wanted to begin this phase of my research by creating a picture of how these children use language when compared with their typically developing peers. I looked at a language milestones chart for children 1-2 years old and 2-3 years old. According to PRO-ED, Inc. (n.d.):

At 1-2 years-old, children, on average, will:

- use 10 to 20 words, including names;
- combine two words such as "daddy bye-bye";
- wave good-bye and plays pat-a-cake.

At 2-3 years-old, children can:

- carry on "conversation" with self and dolls;
- ask "What's that?" and "Where's my?";
- use two-word negative phrases, such as "no want";
- form some plurals by adding "s" (e.g., "book" to "books");
- have a 450-word vocabulary;
- give first name, hold up fingers to tell age;
- combine nouns and verbs (e.g., "mommy go");
- understand simple time concepts (e.g., "last night," "tomorrow");
- refer to self as "me" rather than by name.

Due to the etiologies of these early intervention children, I knew their ability to achieve the same benchmarks would be limited.

I began my survey by asking the SLPs, "How many words does your client use verbally?" Interestingly, at this stage of the children's language development, the two focus areas were remarkably similar. In both groups, 62.5% of children produced 1-5 signs and spoken words, and 25% produced 6-10 signs and words. A difference of 12.5% was noted in the 11-25 word/sign category and the 26+ word/sign category. In Figure 2 below, I have compared those results with the total number of signed words for the same early intervention children.

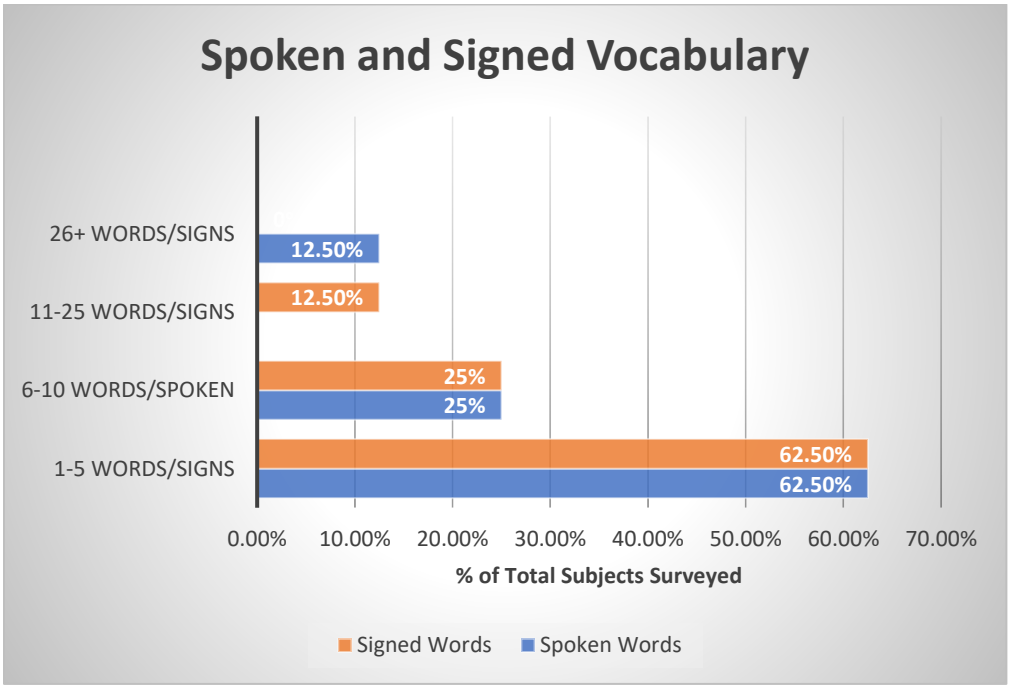

Figure 2. Comparison of spoken and signed vocabulary of total subjects surveyed.

According to the benchmark language checklist, the typically developing 1-2- and 2-3-year-old groups can produce two-word combinations. In my survey group, three children could form two-word verbal combinations, and five could not. Although these numbers were not an exact match, I do consider them closely related at this stage of language development (see Figure 3).

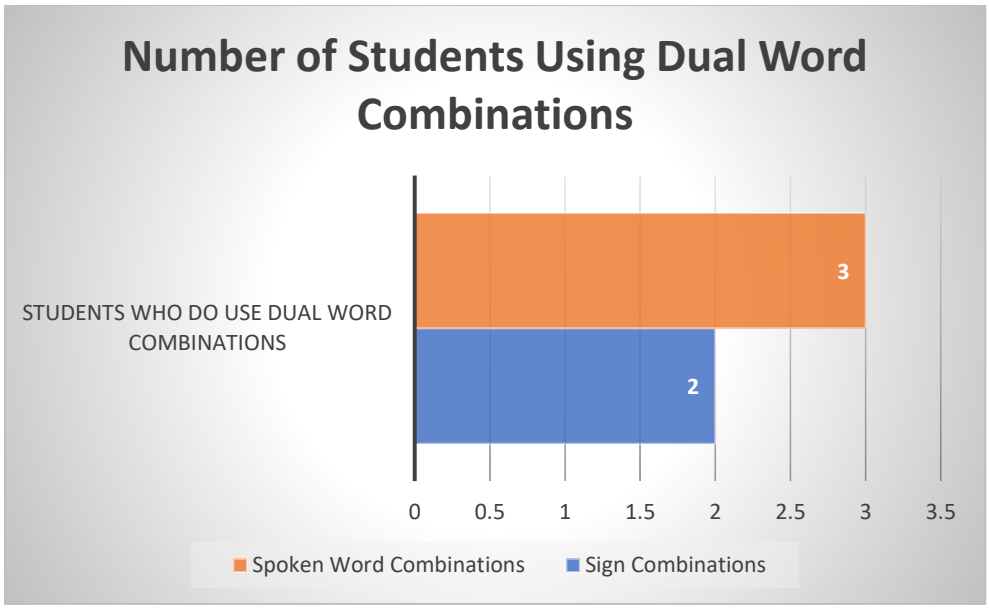

Figure 3. Number of students using two-word combinations.

Now that I had a firm understanding of the number of signs and spoken words these children used in their daily communication as well as their ability to combine words, I wanted to know how they were using their language.

My next survey question asked, "What parts of speech does the student express when signing?" The benchmarks for speech development indicate that nouns and verbs are used as well as names. I focused on nouns and verbs, and the ability to describe with adjectives or adverbs (e.g., "house big" or "dog fast"). As evident in Figure 4, nouns and verbs were the most represented signed parts of speech. Only two subjects expressed nouns, verbs, and descriptive words in their signing.

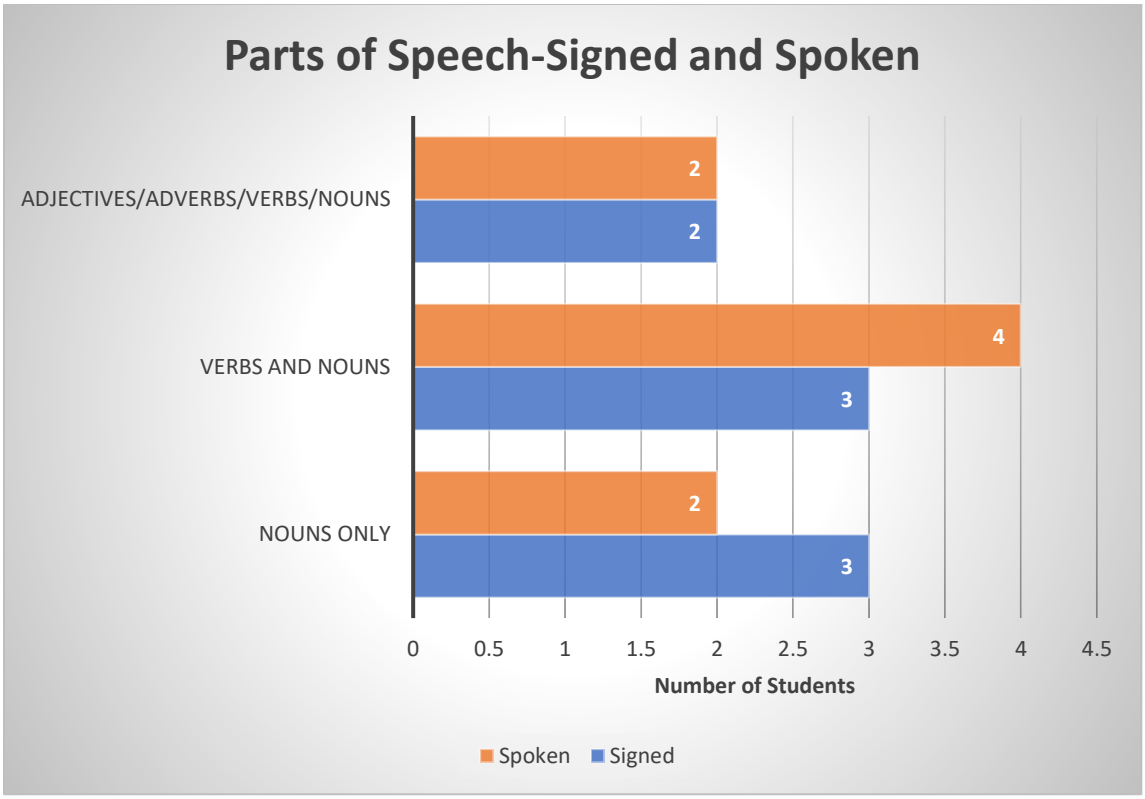

Figure 4. Comparison of parts of speech, both signed and spoken.

I was again intrigued with how similarly the use of signs and spoken words developed in these children. What was becoming clear to me was that most of these subjects were as capable of learning and using signs as they were at using and developing spoken language. Perhaps the most important question for me to ask the SLPs at this point was, "Does signing clarify the child's overall ability to express themselves?" Almost 88% of the SLPs in my survey responded affirmatively.

Parent Connection

As I began working on my literature review, I noticed an important factor I had not previously considered. While kids learned signing in early intervention therapy, there needed to be a support at home who also could actively sign with the child to truly succeed. Therefore, the third method of data collection for my inquiry was a series of interviews with three different parents of nonverbal or language-delayed children who had all received early intervention services. Of the three families, one child was currently active in early intervention, another was enrolled in elementary school, and the third was attending a high school SCORE program. I was unable to find families willing to participate whose children had the same etiologies as my subjects. The children of the families who did participate had varying degrees of cognitive delay.

While kids learned signing in early intervention therapy, there needed to be a support at home who also could actively sign with the child to truly succeed.

The youngest child, who I will refer to as Amy, was 2.5 years old at the time of our interview, and had an unknown etiology but had been diagnosed with a 40% language delay at one year old (shortly after her placement with the family as a foster child at 9 months old). At that time, early intervention services were initiated with a speech therapist who she has been working with for 15 months. I asked the mother how the child communicated with her prior to initiating speech therapy. Her response was:

> She was very unique because she closed her mouth and hummed noises. Instead of actually opening her mouth and speaking or making any noises, it was always a closed-mouth hum. It was like she made up her own language, her own way of communicating. Her speech therapist had never seen anything like it before.

I again thought of the article by Goldin-Meadow (2007) about children creating language in the absence of formal language development. This comment also brought to mind my high school SCORE student Kevin, and his self-created verbal babble and sign combination, and Allie, who created gesture strings to relay information about her injured finger. It seems that Amy (who had been neglected prior to her placement with this family) had developed her own communication by humming. I was curious as to what would happen once signing was introduced. I learned that signing was initiated at 19 months of age. Amy acquired 10 signs in a two-month span, primarily nouns with some noun/verb combinations. Her mother reported that Amy still uses her signs independently and spontaneously. Prior to initiating speech therapy, Amy used no signs and only two or three spoken words. She did demonstrate deixis by pointing at things she wanted, and per her mother, "that phase lasted a long time, the pointing, but she is much more verbal now. Now she uses words and signs." As my interview continued, I had the sense that Amy was a successful user of basic signing to supplement and support her speech development. I asked her mother about the family's connection to Amy's signing. I wanted to know if all members of the family used signing with Amy, or if this was simply a method used solely during speech therapy. The mother informed me that "[they] used to practice at home all the time (for the two months she was first learning). Now, everyone signs with her." At the end of the interview, I asked the mother my fundamental question, "Does signing clarify Amy's overall ability to express herself?" Amy's mother replied, "Yes, absolutely." I asked if there was anything else she would like to add, and she informed me that now, when Amy is frustrated and can't find the words to communicate, she will sign as if to say, "I'll just show you what I want to say until you understand me!"

Post-Early Intervention

I was fortunate to find a family with a child who had received early intervention signing and was now functioning in a mainstream second-grade classroom with speech, occupational therapy, hearing, and vision support. I will refer to the child as Luke. Luke is an 8-year-old male with a complex medical history. Although Luke does have a hearing loss, it is not his primary disability and is considered mild to moderate. Luke does wear bilateral hearing aids which brings his hearing to within normal range. Luke's language delay was severe—expressing no spoken words until age 3. Luke's mother reported:

> He learned signs in early intervention and used them both at home and at therapy. Eventually, he would learn the sign first, then he would learn to pronounce the word.

> That was our first big jump. They [preschool speech therapists] gave him an ACD, but he barely used it. It was like he thought he was more advanced than that.

According to his mother, Luke has developed in his verbal language acquisition to match that of his typically developing peers. His speech difficulties in articulation continue, but he no longer signs at home. If Luke is misunderstood due to a pronunciation error, he will sign the first letter of the word he is trying to say for clarity. This has been a successful strategy for Luke both at home as well as at school, although it is not a strategy he uses spontaneously with friends. I wanted to know more about Luke's signing and his basic use of language during his formative language development years. I learned he had an extensive vocabulary of over 30 signs and knew all his signed letters and numbers. He first learned nouns and some verbs, and after a few months, was using them in noun/verb combinations (e.g., "eat, cookie, want"). He also displayed the use of descriptive signs, such as "my house big."

One of the methods his hearing and vision itinerants used that interested me was a naturalistic play method. The family was instructed to put toys out of his reach so he would have to use his language skills to request toys he wanted. Once he made the request (through sign or vocalization), they were to praise him, retrieve the toy, repeat the vocal word *and* sign for the toy, and then play together with him (guiding him when another request arose). This naturalistic method, based on a playful but structured interaction, parallels Wong and Kwan's (2009) study of naturalistic but structured play methods in sign and vocal language development. Luke's mother reported that it was "difficult to always have the toys picked up, but [they] worked hard to follow the request of the vision and hearing itinerants." She also added, "The entire family learned all the signs that Luke used and actively tried to sign with him at home." I noted that Luke was very skilled at combining strategies to be understood. He combined voice, signed letters, and gestures, and he had even begun to type words that he was trying to express when others could not understand him. Luke's multistrategy communication was strikingly similar to my SCORE subject Katie and my FBI subject Will.

Lack of Family Support

The final interview I arranged did not take place. It was rescheduled several times, but the mother had to cancel each time. I was ready to abandon this interview, but I did find some value in informal discussions with the mother, who then granted her consent for me to include her comments in my inquiry. Her daughter, whom I will refer to as Tina, is globally delayed due to severe epilepsy and is completely nonverbal at 17 years old. I was told that Tina received early intervention services and signing was introduced, but the mother explained, "I'm probably a bad mother, but we really didn't do the signing at home. We just didn't get it." I included this comment because the family component to learning a new and possibly difficult language is not an easy task. I believed this mother wanted to speak with me (she responded to my post on social media), but truly felt guilty for not following through with a suggested therapy method, and therefore could not follow through with the formal interview. I happen to know this mother has spent 20 years with two special needs children, and she is a very kind, involved, and loving mother. But it does show that learning a second language requires true commitment and time from the family, and that is something that simply isn't appropriate for every nonverbal child in every family.

Conclusions and Reflections

My inquiry has provided a tremendous amount of insight into the challenges of building a foundation of communication for the nonverbal child. I have learned there are inherent limiting factors to acquiring signed language, such as etiologies like autism spectrum disorder with a combined diagnosis of apraxia, lack of family support, lack of consistency in methodology, and physical limitations. However, I have also learned that children who are physically capable of signing and who received consistent structured signing support from early intervention, school speech therapists, and family, are more than likely to seek out multiple strategies to be understood throughout their educations.

My initial observations of Kevin, Allie, and Katie introduced a new variable into my inquiry equation which was the "interpreter." All three students used various modes of signing and gesturing to communicate, but the missing component was someone to accurately and consistently interpret their gestures and signs. Kevin and Katie both responded affirmatively when someone did voice interpret their signs or gestures accurately, but the frustration in Katie's distant gaze when someone incorrectly voice interpreted her gestures made clear her desire to be understood and her despondence when she was not. I believe if both students had received consistent signed support from early intervention through high school, their signed communications would have been much clearer, and the ability to interpret their signs would have been more consistent and accurate.

In my opinion, Allie was a perfect candidate to learn to sign to support her expressive language. Her gesture string in the cafeteria, complete with eye contact and facial gesturing, indicated she had something of significance to say, but lacked a mode of communication to express herself. Although Allie had no functional speech, she seemed to have acceptable fine and gross motor skills capable of producing most all handshapes and movements in a basic sign language vocabulary, as well as an interest in connecting with others and expressing herself. Once I studied the sign components of palm orientation, handshape, location, and movement that Katie, Kevin, and Will produced, and compared those signs to native deaf child signers, I could see just how similarly my subjects with cognitive challenges could approximate their signs.

A second unexpected variable that added a degree of difficulty to my inquiry was the use of ACDs in the middle school classrooms in place of signing and gesturing. My understanding was that some nonverbal students had been taught varying degrees of signing or gesturing during early intervention or elementary school, but those efforts were abandoned in middle school. Instead, students were given ACDs and discouraged from signing to create a stronger level of fluency with the ACDs. I understood why these devices were introduced, and I could observe their usefulness for some students, but I could not understand why they were used for so many other children who seemed to struggle for any degree of skill with the ACD in expressing themselves. I concluded that the ACD was being used as a "fix-all" for language delay, but in my opinion after observing their use, I felt they were overused and inappropriate for more than half of the students who were assigned one. Additionally, the introduction to this technology also meant an amputation of the previous methods of signing support and instruction. If the ACDs had been introduced and encouraged with signing, I believe more children would find success in

selecting appropriate strategies to communicate, and the distinction between the students who thrive with ACDs and those who thrive on signing would become more evident to the staff.

My observations confirmed that the students with the greatest family support and early signing intervention were also students who used multiple strategies to be understood, which resulted in communication of greater depth. The example of Will and his use of signing to discuss the storm did result in his being misunderstood by a paraprofessional who could not correctly identify his signing. Although he created a detailed complex sentence a few moments later with his ACD, the lack of timeliness of the device itself also led to misunderstanding. I was absolutely impressed, however, with the structure of Will's sentence and his persistence in wanting to be understood. When I compared Will's constructed sentence on the ACD with his verbal ability, there was far greater mastery when he structured the sentence on the ACD or combined his signs with his spoken language. His verbal expression alone rarely exceeded two words. I was sure that with structured support of his signing, consistent use, and someone to interpret his signs, Will would be able to participate as freely as his verbal peers in casual and formal interactions. This consistency, I believe, would also continue to aid his use of the ACD.

The personal interviews I conducted confirmed for me the potential benefits of introducing signing to language-delayed children, and stressed the vital role the family plays in the child's language development and use of multiple strategies to be understood. I was greatly intrigued by examples of self-creation of signed or spoken language in the absence of formally taught language. This illustrated the primal need for expression, despite cognitive impairment, and the child's tenacity and creativity to find a way to communicate. The students who seemed to create their own languages impressed me as perfect candidates for learning signing in support of expressive language.

I could not identify any negative effects of introducing signing to this population of students. The positive effects of introducing signing on the developing language of the delayed verbal child are significant and worthy of further research. I concluded that when a child who struggles to speak produces a sign and receives positive feedback, they want to communicate more—they find more to say and they find creative ways of expressing themselves when their ability to produce words fails them. When signing is consistently produced, encouraged, and supported, the child's ability to be understood increases and leads to greater overall comprehension and mastery of language. When a child lacks the skills to communicate, frustration develops and attempts to communicate diminish. As a future teacher, I hope to use my findings from this study to create a more consistent and appropriate method of teaching language to nonverbal and verbally delayed children in my district from infancy through high school age. I also hope this has given me a greater understanding of the population of students I hope to teach, and the insight to work with other professionals whose goals of developing language match that of my own, but whose methods may differ.

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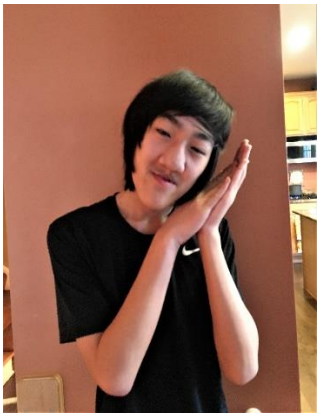
Appendix A

Comparison of Kevin's Sign Production Versus a Native Deaf Signer

I have chosen a child model to sign for my subjects, Kevin, Allie, and Will. He has recreated their handshapes, movements, palm orientation, and location exactly as I observed them. Kevin's gross and fine motor development is within normal limits for a child his age, so I chose a native child signer (deaf user of ASL) of comparable age with typical gross and fine motor skills with which to compare his sign productions.

Illustration 1

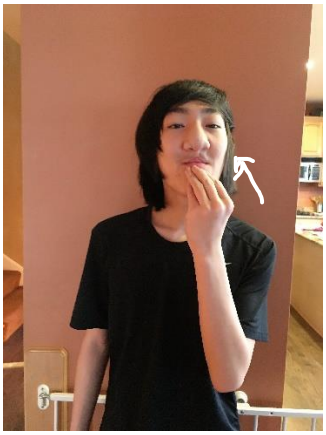


Kevin's production
"Bed"

Illustration 2

Native signer's correct production
"Bed"

Illustration 3

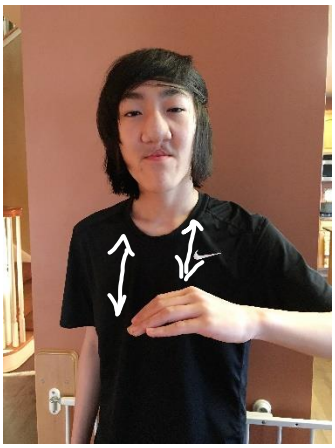


Kevin's production
"Kiss" ("Smooches")

Illustration 4

Native signer's correct production
"Kiss"

Illustration 5

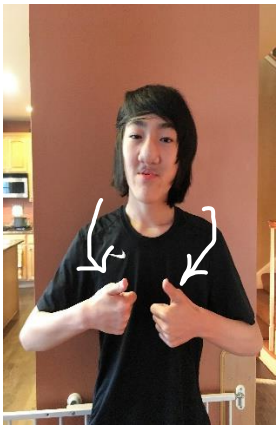


Kevin's production
"Basketball"

Illustration 6

Native signer's correct production
"Basketball"

Illustration 7

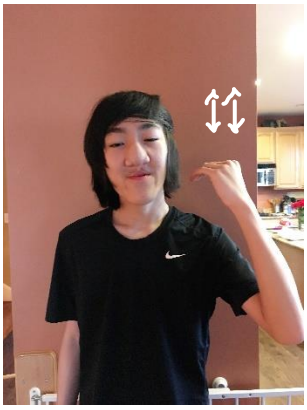


Kevin's production
"Coat"

Illustration 8

Native signer's correct production
"Coat"

Illustration 9

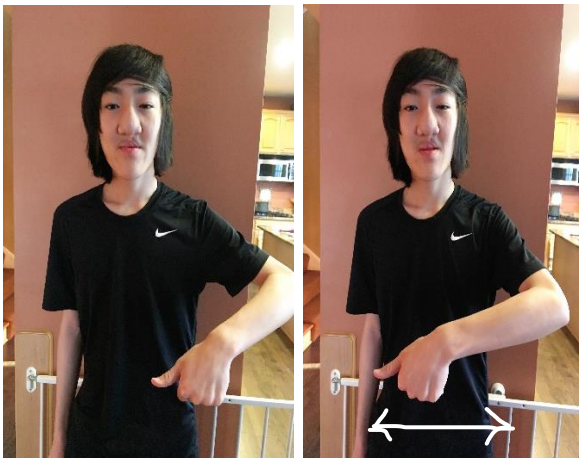


Kevin's production
"Backpack"

Illustration 10

Native signer's correct production
"Backpack"
Note: Hand location should be slightly higher on shoulders.

Illustration 11

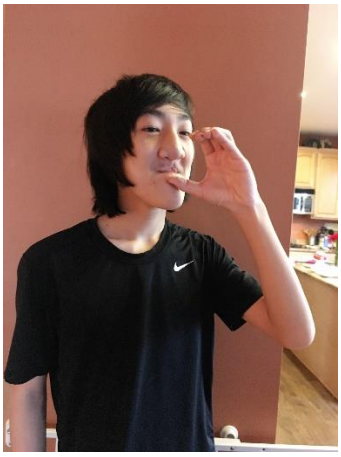


Kevin's production
"Ironing"

Illustration 12

Native signer's correct production
"Ironing"

Illustration 13



Kevin's production
"Drink"

Illustration 14

Native signer's correct production
"Drink"

Illustration 15

Kevin's production
"Lunch"

Illustration 16

Native signer's correct production
"Lunch"

Appendix B

Comparison of Katie's Sign Production Versus a Native Deaf Signer

I chose a preschool-aged child signer to illustrate the correct sign production to compare with Katie's signing, since her gross and fine motor development is similar to that of a 4- to 5-year-old child.

Illustration 1

Katie's production
"Stinky" (Katie's sign for "I like her/it")

Illustration2

Native signer's correct production
"I like…"

Illustration 3

Katie's production
"Later"

Illustration 4

Native signer's correct production
"Later"

Illustration 5

Katie's production
"Hair" (Katie's sign name for Dora)

Illustration 6

Native signer's correct production
"Hair"

Illustration 7

Katie's production
"Book"

Illustration 8

Native signer's correct production
"Book"

Illustration 9

Katie's production "Monkey"

Illustration 10

Native signer's correct production "Monkey"

Illustration 11

Katie's production "Cookie"

Illustration 12

Native signer's correct production "Cookie"

Illustration 13

Katie's production
"Thank you"

Illustration 14

Native signer's correct production
"Thank you"

Illustration 15

Katie's production
"Yes"

Illustration 16

Native signer's correct production
"Yes"

Illustration 17

Katie's production
"No"

Illustration 18

Native signer's correct production
"No"

Illustration 19

Katie's production
"Hungry"

Illustration 20

Native signer's correct production
"Hungry"

Illustration 21

Katie's production
"Snack"

Illustration 22

Native signer's correct production
"Snack"

Appendix C

Comparison of Will's Sign Production Versus a Native Deaf Signer

Will's gross and fine motor ability is considered within normal range for a 10-year-old child, so I selected a child signer with age-appropriate gross and fine motor development to compare with his sign production.

Illustration 1

Will' production
"Thunder"

Illustration 2

Native signer's correct production
"Thunder"
Note: Pointing to ear first is correct production.

Illustration 3

Will's production with classifiers
"Lunch Box"

Illustration 4

Native signer's correct production
"Lunch Box"

Illustration 5

Will's production
"Thank you"

Illustration 6

Native signer's correct production
"Thank you"

Illustration 7

Will's production
"Dad"

Illustration 8

Native signer's correct production
"Dad"

Illustration 9

Will's production
"Help"

Illustration 10

Native signer's correct production
"Help"

Illustration 11

Will's production
"Yes"

Illustration 12

Native signer's correct production
"Yes"

Illustration 13

Will's production
"No"

Illustration 14

Native signer's correct production
"No"
Note: This is a single hand sign. Child has added the right hand unnecessarily.

Illustration 15

Will's production
"Ice cream"

Illustration 16

Native signer's correct production
"Ice cream"

Illustration 17

Will's production
"Cherry"

Illustration 18

Native signer's correct production
"Cherry"

Illustration 19

Will's production
"Cook"

Illustration 20

Native signer's correct production
"Cook"

Illustration 21

Will's production
"Eat"

Illustration 22

Native signer's correct production
"Eat"

Illustration 23

Will's production
"Home"

Illustration 24

Native signer's correct production
"Home"

Appendix D

Semistructured Parent/Teacher Interview

Date: 00/00/00
Interview with: _____
Subject: _____

1. How old is (student)?
2. What grade is he/she in?
3. What kind of school or school program does he/she attend?
4. Does (student) receive outside therapy for speech or communication?
5. Can you tell me a little bit about (student) and some of the challenges that have led to his/her speech delays?
6. Does (student) use a communicative device? If not, has one been used in the past? If so, what were outcomes of that method?
7. At what age was signing or gesturing introduced, and who introduced him/her to signs?
8. Does (student) express himself/herself verbally?
9. At what age did (student) begin to vocalize?
10. Once signing was introduced, what happened to his/her verbal expression?
11. Is signing used at home? If so, with whom?
12. Does (student) sign spontaneously in social settings with peers?
13. Does (student) combine verbal language and signs or gestures spontaneously?
14. Are signs expressed with or without prompts?
15. What are (student)s' total number of signs/gestures?
16. Is signing or gesturing stressed at school or therapy?
17. What kind of signs does (student) typically sign (e.g., nouns, verbs, adjectives, adverbs)?
18. Does (student) use signs in combination (e.g., "me, cookie, want")?

19. Do you feel that signing/gesturing helps to clarify (student)'s overall expressive ability?
20. Is there anything you'd like to add about (student) and his/her communication?

Appendix E

Speech and Language Pathologist Survey

1. **At what age was signing introduced?**
    a. Infant-24 months
    b. 2-5 years
    c. 6-10 years
    d. 11 years +

2. **Where did student acquire signed vocabulary?**
    a. Self-taught
    b. Early intervention
    c. School speech therapy
    d. Private instructor
    e. Other

3. **Is signing encouraged and used in the home?**
    a. Signing is demonstrated daily with family members and student in the home.
    b. Signing is used by the student only.
    c. Signing is not demonstrated in the home by student or family.
    d. Signing is encouraged at home by family members, but is not produced independently by student.

4. **How many signs or gestures does the student use?**
    a. 0
    b. 1-5
    c. 6-10
    d. 11-25
    e. 26 or more

5. **How many established words does the student use verbally?**
    a. 0
    b. 1-5
    c. 6-10
    d. 11-25
    e. 26 or more

6. **Once signing or gesturing was introduced, did the student's verbal language:**
    a. Increase
    b. Decrease
    c. Stay the same

7. **When signing, what parts of speech does the student express? (May select more than one answer.)**
    a. Nouns

b. Verbs
c. Adjectives/Adverbs

8. When speaking, what parts of speech does the student express? (May select more than one answer.)
a. Nouns
b. Verbs
c. Adjectives/Adverbs

9. Does student use signs in combination (e.g., "me, cookie, want")?
a. Yes
b. No

10. Does signing clarify the student's overall ability to express himself/herself?
a. Yes
b. No

11. Age of child:

12. Etiology of child: