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Accommodations and Modifications for children who are Deaf and on the Autism Spectrum:
A literature review

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Educating and Understanding Deaf Students with Additional Disabilities

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Introduction

Autism is a growing phenomenon here in the United States, with more and more children being diagnosed with having Autism every year. Autism was first identified by Dr. Leo Kanner of John Hopkins Hospital in 1943. The diagnosis is more common in boys than girls with a ratio of 4:1. Autism occurs in all races, ethnicities, social groups, cultures, and even with other disabilities, including Deafness. Today about one in every 150 individuals are diagnosed with Autism; making it more common than AIDS. There are five developmental disorders that fall under the Autism spectrum; Autism, Asperger's Syndrome, Rett Syndrome, Pervasive Developmental Disorder-Not otherwise specified (PPD NOS), and Childhood Disintegrative Disorder (What is Autism: An Overview, 2009).

Autism is defined as a pervasive developmental disorder characterized by three main characteristics: social impairments, deficits in verbal and nonverbal communication, and repetitive behaviors (Bodfish, Lam, & Piven 2008, What is Autism: An Overview, 2009). To be diagnosed with Autism Spectrum Disorder (ASD), each of these main characteristics must be present; however the characteristics and severity of Autism varies from mild to severe, as well as the clinical presentation in each individual (Bodfish, Lam, & Piven 2008, What is Autism: An Overview, 2009). People with ASD have been associated with impairments in the acquisitions of various functioning aspects of language, speech, and non-verbal communication, as well as having a lack in understanding and showing social emotions towards others (Hudry & Slaughter, 2008, Stiegler, 2007). Often time's children with Autism have poor eye contact, defective fine or gross motor skills, self-stemming behaviors, and sensory issues that can cause abnormal behavior (e.g. placing everything in

their mouth because it may be the only place where their senses work appropriately to process that information to their brain) (Odyssey, 2008).

The prevalence of Autism is growing rapidly each year as stated above. Autism is even more prevalent co-existing with deafness, approximately occurring once in every 76 deaf children (Odyssey, 2008). Teaching children with Autism is a puzzle. More so, teaching a child with a dual-diagnosis of Deafness and Autism is an even more intricate and complex puzzle. Finding the pieces to complete the puzzle relies on numerous strategies combined from what we know that works for deaf children, and for children with Autism (Odyssey, 2008).

Children who are diagnosed with being deaf and children who are diagnosed with having Autism, often times share some of the same characteristics: may not respond to when called, have poor or no communication skills, have poor peer interaction skills, and may exhibit poor behaviors because of their lack of communication options. Some of the main differences in a child who is deaf and has Autism versus a child who is only deaf is their lack of eye contact and their need for self-stemming behaviors that often interfere with learning. These children may also have intense sensory issues that can interfere with life or learning in a classroom: such as sensitiveness to light, smell, and the texture of items (Odyssey, 2008).

Choosing a mode of communication for a child who is deaf can be difficult. Choosing a mode of communication for a child who is deaf and has Autism is even more

challenging. Although most children learn language through auditory methods, deaf children usually learn through a visual system. There are many factors that play a part in choosing a mode of communication for a child who is deaf; type of hearing loss, age of onset, how much residual hearing there is, exposure to primary language, and of course the parents preference (CPCC, 2006-2009). Figure 1.1 shows communication options to explore when trying to decide what mode of communication is best for your child, but because every child and family is different, the outcome of each communication method can be different for each individual (CPCC, 2006-2009).

Figure 1.1 Options of acquiring language through (CPCC, 2006-2009, Odyssey, 2008)

Children dually-diagnosed with deafness and autism have the same options as a deaf child for acquiring language, although there are additional concerns when trying to acquire knowledge due to their cognitive processing disorders, lack of eye contact, and motor limitations. This becomes an issue when deciding what method(s) of

Method of Communication	
ASL	A language with its own grammatical structure and syntax. Any abstract thought can be conveyed as any other language can.
MCE	Manually coded English systems that combine fingerspelling and sign language following English word order. <ul style="list-style-type: none"> - SEE 1 - SEE 2 - LOVE
Lip-reading	The practice of reading speech by focusing on auditory skill development, speech reading, and speech training.
Oral-visual	Relaying on speech, speech reading, hearing aids and cochlear implants.
Cued Speech	Visual communication system with hand cues to help differentiate between similar sounds that emit from the mouth in the same way
Total Communication	Philosophy that utilizes numerous different communication approaches that work best for the student to help with maximum acquisition.

communication to use for children who are deaf and have autism. So how do we teach children whose natural language is a visual system, yet there are numerous complications with eye contact and motor imitation? Imagine using your hands to communicate; yet you have difficulties copying a motor movement that was previously made (e.g. seeing a sign then imitating it correctly, or even tapping the table with your index finger,) (Odyssey, 2008)? These complications will make it more difficult for a child with autism to acquire sign, although some say that communication with a child with Autism without gestures or other facial expressions as used in Sign language is impossible (Odyssey, 2008). So what accommodations and modifications are needed to effectively teach our children?

Today there is very little research that has been done on effective teaching strategies for children who are Deaf and have Autism, however research has been done on strategies to teach the two disabilities separately. We also know that when planning an educational program for a student who is Deaf and has Autism two things must be implemented; Identify the concerns, and appropriate early interventions (Odyssey, 2008).

This Lit Review will infuse a case study from the 2008 Odyssey issue on Deafness

and Autism, as well as other strategies that have been successful for doctors, teachers, and parents of children who are deaf and have autism.

Selah is a deaf girl born to an all-deaf family. She signed her first word “more” at 8 months, and was developing perfectly normal, only she couldn’t hear. At 11 months she was interacting with peers as well as combining two word combinations. She was meeting the typical milestones. At 22 months she was keeping her parents on time in the morning, signing “Time go school now (Odyssey, 2008).”

Around 26 months is when her parents began to notice her opening and closing the door of her play kitchen constantly, repeatedly tracing her own dolly stroller trail until she was dizzy, habitually rocking her body back and forth while laying down for long periods of time, and other obsessive compulsive behaviors. Soon she began to deteriorate quickly; her eye contact and attentions span became very limited. Her language regressed as well, declining from 5-6 word sentences to 1-2 words at a time. Her parents also began to notice her creating messes with paints, bubbles, and other sensory based activities (Odyssey, 2008).

At age three, Selah was enrolled at the California School for the Deaf (CSD), where she was to begin her education. On the first day of school, Selah entered the room and immediately began running around the room searching for something, but no one knew what, even Selah didn’t know. She would barely make eye contact with

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anyone, including her mother, and wouldn’t acknowledge any of the other children. It was that day her mother snapped out of denial and realized her daughter was different. Funded by the school district, clinical psychologist Dr. Johnstone, who also is the assistant director of special education in the Pleasanton Unified School District (PUSD) and fluent in ASL, began administering tests on Selah. Selah’s Diagnosis, Autism (Odyssey, 2008).

Because Autism affects each child differently, there is no single strategy or theory that is guaranteed to work effectively for all children with Autism (Odyssey, 2008). In the 2008 Odyssey Issue, focusing on Autism and deafness, there are parents with personal stories as well as professionals such as; Dr. Mei Yeh-Kennedy, Dr. Stephanie Ellis-Gonzales, and Janet Weinstock, all Gallaudet graduates and mothers of children who are dually-diagnosed deafness with autism, and Lee Ann Bradley, Brandi Krakowski, and Ann Thiessen, three deaf educators in the state of Iowa, that offer their insights on strategies and theories that can be combined to help successfully teach children who are dually diagnosed with deafness and autism. Deaf educators encompass a variety of teaching tools and strategies essential for teaching children who are deaf, yet if they can combine their strategies with strategies used to teach children with Autism, the possibility for learning can increase for a child dually diagnosed (Odyssey, 2008).

Easterbrooks and Handley conducted a case study of a 6-year old boy with a dual diagnosis of deafness and Pervasive Developmental Disorder- Not Otherwise Specified. It expresses some of the challenges faced with acquiring language in combination with the negative behaviors for children dually diagnosed with deafness and Autism (Easterbrooks & Handley, 2005-2006).

This particular child, diagnosed with a degenerative hearing loss, started his early intervention at the age of two. He was enrolled in a special-needs pre-school in his zoned school system. At age four he was diagnosed with Autism and then

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underwent cochlear implant surgery. He was committed to using his implants, which he did regularly, however his speech and listening skills had not improved in the following two years (Easterbrooks & Handley, 2005-2006).

Upon entering pre-school, the local school system then provided him with 2.5 hours of one-to-one therapy per a week. He also received an extra one-hour of therapy three times a week by a private speech-language therapist specializing in language development with cochlear implants. Sign Language was added into his program as well, although it was taken out of his program upon entering kindergarten (Easterbrooks & Handley, 2005-2006).

Once he entered first grade, it was noticed that he had made no significant educational gains and needed immediate remediation. He began language arts instruction with a teacher for the deaf in a resource setting. Specifically targeted were speech and auditory instruction. She began incorporating sign into his program again. Even though his progress increased remarkably, he was still unable to communicate his basic needs (Easterbrooks & Handley, 2005-2006).

Later on in first grade his communication was improving, although his PDD-NOS characteristics were becoming more prevalent. His pragmatic skills were suffering and he often times became obsessed with telling repetitive stories and participating in self-stemming behaviors (Easterbrooks & Handley, 2005-2006).

The behaviors began to become detrimental to his learning, as well as causing social issues. The other kids he saw during school began to tease him often for being so different. At this point ABA therapy was introduced into his program. The goal of his ABA therapy was to minimize the behaviors that were detrimental to his learning (Easterbrooks & Handley, 2005-2006).

ABA therapy for this child worked great. He began to intently listen and follow directions and was able to be positively reinforced by a simple head nod and a wink from the teacher. He began to have awareness of his own negative behaviors and was soon able to modify his self-stemming negative behaviors into positive acceptable behaviors without prompting (Easterbrooks & Handley, 2005-2006).

Unfortunately once he returned to the classroom from summer break, his negative behaviors were apparent once again. The same ABA therapy was applied, which in return eliminated the negative behaviors again. This study however, did not have explicit information explaining how the extinction of his negative behaviors impacted his learning (Easterbrooks & Handley, 2005-2006).

From the case study above, we can state that there is no single method to teaching dually diagnosed children, although a combination of the different methods can be implemented to help increase the successfulness for acquiring language and eliminating negative behaviors.

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In the Easterbrooks and Handley article, they noted that children currently diagnosed with Deafness and Autism are most likely being taught through behavioral therapy, pharmacological therapy, or a combinations of the two, like in the case study above.

Behavioral therapy incorporates specific interventions, including ABA therapy, one-to-one speech, and a visual communication system either being a picture communication system, or a sign language system to help communicate, learn, and address unwanted or inappropriate behaviors (Easterbrooks and Handley, 2005-2006). Figure 1.2 explains some of the interventions used in behavioral therapy. Pharmacological therapy is mainly used with children who suffer from medical problems or conditions such as, seizures, self-injurious behavior, or digestive difficulties (Easterbrooks and Handley, 2005-2006).

Figure 1.2 Behavioral Therapy Interventions (Dombeck, Reynolds, 2006, Boeree, 2006, Martin, Pear, 1999)

Interventions	
<p style="text-align: center;">ABA Applied Behavior Analysis is the study of behavior</p>	<p>- Uses learning theories derived from behavior psychologists, including shaping, chaining, successive approximation and Skinner’s reinforcement system.</p> <ul style="list-style-type: none"> - Shaping is differentiating reinforcement of approximations towards a targeted response. - Chaining is linking different steps together to end at a targeted response that incorporates all steps (e.g. brushing teeth; 1st, you teach how open the toothpaste, 2nd how to apply toothpaste, 3rd how to brush teeth, 4th how to rinse mouth, etc.). Be cautious: chaining can be positive or negative (negative e.g. learning a new sign; chaining parts of a wrong sign with the right sign can teach a child a wrong sign entirely) - Successive approximations are the steps along the path that a student takes from the very beginning step to the targeted response. - Reinforcement Systems are used to increase the likelihood for a behavior to reoccur. Reinforces can be tangibles, edibles, praise, or any desired item a child may want. To be successful, the reinforcer needs to be given immediately after targeted response emits. Each reinforcement system may be different for each individual. <p>- Also used to change inappropriate behaviors into socially acceptable behaviors. The child would be reinforced for his appropriate behavior and would not be reinforced at all for any of his negative behaviors. Eventually the behaviors will become extinct and the reinforcement will no longer be necessary. ABA allows us to shape the behaviors into what is appropriate (Boeree, 2006).</p>
<p style="text-align: center;">Sign Language</p>	<p>- A visual language used to communicate and convey abstract thoughts as with any other language.</p>
<p style="text-align: center;">PECS Picture Exchange Communication System</p>	<p>- Used to communicate through pictures specifically related to the user. The system works by the child expressing their needs and desires through exchanging pictures with the teacher.</p>

Communication Options

Sign Language is a visual language used to communicate and convey abstract thoughts as with any other language. Often times Sign Language is used to teach hearing children with Autism in the Public school system, although the signs may be modified to

better suit the child. One issue with teaching sign to a child with autism in the public schools is that their acquisition of language may be limited because the teacher's sign skills may be limited, therefore the teacher cannot fully teach a language in which to communicate with when they can't communicate with it themselves.

Communicating with a child who is Deaf and has Autism without using a sign system can be challenging, however alternative methods do exist. For example, the Picture Exchange Communication System (PECS) is used to communicate through pictures specifically related to the user. The system works by the child expressing their needs and desires through exchanging pictures with the teacher. A typical use of PECS would involve the teacher asking, "What do you want for lunch today?" The child responds by finding a picture of chicken nuggets, corn, juice, and a cookie. The child places them all on their own personal Velcro communication board to show the teacher what they want for lunch. New pictures are constantly required to be added to ensure the student is building vocabulary and able to express their needs and wants. Often times if a child cannot communicate through speech or through Sign, PECS is a great tool to use. It has been found to calm

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Student's down behaviorally because instead of playing a guessing game, trying to figure out the speech or sign, the student can pick a picture up, hand it to the teacher, and the communication is now processed. Describe a research study that supports this statement/paragraph. The student can then refocus their attention back on learning (Odyssey, 2008, Pyramids, 2006-2007)

A combination of strategies of what works with children who are deaf and what works with children who have autism was also implemented into Selah's education. Selah's response to the multiple strategies implemented into her education was exceptionally positive.

Although Selah had a new obstacle in her life, Autism, her parents believed that she needed to be around other deaf children in an environment enriched with her natural language and culture. They also knew that she needed additional services to help control the Autism urges. Learning in a typical deaf classroom, Selah probably would not reach her full potential and that was something her parents came to realize with the help of professionals. They then began to brainstorm alternatives for Selah's education (Odyssey, 2008).

Dr. Johnstone suggested to Selah's family that Selah receives 25 hours of ABA therapy a week, Occupational therapy twice a week for 25 minutes, and Speech therapy for 20 minutes once a week. Soon after, Selah began attending therapy 3 days a week at the PUSD. She was provided an aid fluent in ASL that worked individually with her in her language and social skills environment, as well in her Deaf education environment at the CSD (Odyssey, 2008).

As of 2008, Selah was 5 years old and had made great progress in only two years. When this study took place, she had a vast vocabulary, was forming simple noun/verb pairings, commanding for desired items, answering general and specific questions, and emitting pre-actions for writing. She also became more engaging and sociable with her peers. Her eye contact had improved to where she could sit and attain for 20 minutes (with reinforcement) at a time (Odyssey, 2008).

Collaborative Teaching

Deaf students with autism will make the greatest progress socially, behaviorally, and academically with a team of professionals working collaboratively to ensure individual and group success. Selah's success is thanks to the many people who worked

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collaboratively to provide Selah with a learning environment that was culturally and linguistically rich. At CSD, she was taught with a total communication philosophy along with her peers, and was able to be immersed in her natural language. At the PUSD class, she had important ABA therapy, Speech, and OT that contributed to her educational improvements. There also were many accommodations and modifications implemented into each program to help Selah ensure a successful day at each school (Odyssey, 2008).

Teaching Strategies

Because Deafness and Autism do have similar characteristics, some of the teaching strategies for teaching language acquisition and social skills will overlap. For students with Autism there are many tools and tips that play an important part in ensuring an effective learning day. Figure 1.3 explains some simple accommodations and modifications that can be made in addition to other therapies, to help maximize a child's learning in the classroom, who has Autism. The figure also shows helpful tips that can be used in the classroom (Odyssey, 2008).

Discussion

There is a paucity of research on children who are dully diagnosed with Deafness and Autism causing a lack of evidence-based strategies. To date, little is known about the identification, assessment, communication, treatment, education, behavior, and social impairments of children who are Deaf and have Autism. We have proof of what strategies and theories combined works now for children who are deaf and for children who have Autism, but this is a continually growing field in which professionals, parents, and advocates of children who are deaf and have Autism need to add to. As more educators implement and try different strategies, we will have a better understanding

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of what works best for educating individuals with Deafness and Autism in the years to come. "Increased knowledge and training can translate into increased success for our deaf/Autistic individuals" (Odyssey, 2008).

Figure 1.3: Accommodations, Modifications, and Helpful Tips for teaching children with Autism (TEACCH, 2006, Odyssey, 2008).

Accommodations	Modifications	Helpful Tips
<ul style="list-style-type: none">- Create a structured environment suitable for the child.- Have a schedule of the day present for the child to see.- Make sequenced of activities predictable and clear to the individuals. *This enables them to be aware of what is happening	<ul style="list-style-type: none">- For children whose mode of communication is Sign Language, yet they have motor limitations, modify the signs as close you can to the original so that the student can still communicate their needs.	<ul style="list-style-type: none">- Early intervention as soon as possible is extremely important. According to the National Institute of Health and the U.S. Department of education, there is evidence documented showing that children who are identified earlier on and who

- throughout the day and helps them to transition smoothly from one activity to another.
- Use a visual method of communication. *Often times, children with Autism have an easier time understanding visual language than spoken language.
 - Incorporate visuals and pictures as much as possible.
 - If a child is exhibiting self-stemming behaviors, take a break and begin an activity that is sensory-based. After their sensory urges have been fulfilled, they can return to work and re-focus their attention again. *Breaking and reinforcing often can help to keep the behaviors to a minimum.
 - Create an environment that incorporates their sensory-based desires such as:
 - Dim lights
 - Sand/rice boxes
 - Swings
 - Music
 - Using a variety of strategies can enhance the acquisition of learning language and communication skills.
- Continue to shape the sign until the correct sign is in their vocabulary.
 - Set-up situations to physically show children the proper way to interact with their peers. "Hand-over-Hand" teaching for appropriate play.
 - Use an alternate form of curriculum. ABBLES is a test often used to assess students with Autism. The results from the ABBLES test can then be used to create an individualized curriculum or program for the specific individual assessed. You then can work on important deficits such as; Labeling nouns, verbs, etc., matching to sample, social and group skills, and more, as well as academics to help increase their learning.
- are exposed to immediate educational intervention, often times show a boost in their communication, social, and cognitive skills versus a child who may have been diagnosed later on in life.
- TEACCH, also known as Treatment and Education of Autistic and Related Communication-Handicapped children, is North Carolina's statewide program for serving individuals with ASD and their families. They provide evidence based service training and research programs to individuals of all ages diagnosed with ASD. They also provide support, clinical services, parent training, support groups and more for the families of individuals diagnosed with ASD.

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