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Qualitative Case Review of a Male with Down Syndrome

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QUALITATIVE CASE REVIEW OF A MALE WITH DOWN SYNDROME

A Capstone Experience/Thesis Project Presented in Partial Fulfillment

of the Requirements for the Degree Bachelor of Science

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By

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ABSTRACT

Down syndrome is the most common chromosomal condition in the United States. In the United States, about one of every 700 babies is diagnosed with Down syndrome. The purpose of this study was to assess pre-existing data on a 13-year-old male with a diagnosis of Down syndrome to contribute to research on this chromosomal abnormality. The individual received speech and language related services at Western Kentucky University beginning in 2007. Through analysis of previously collected data, the researcher created a qualitative case review that identified the progress of an individual with Down syndrome and emphasized what attributed to his progress. The purpose of this qualitative case review was to investigate the inclusion of motivators, use of augmentative and alternative communication (AAC), and engagement in hippotherapy sessions using an AAC device. The inclusion of motivators in therapy sessions, use of AAC, and engagement in hippotherapy sessions were expected to increase the client's communication abilities. Through analysis of previously recorded therapeutic treatments, the investigator concluded a qualitative case review.

Keywords: Down syndrome, speech-language pathology, motivators, hippotherapy, augmentative and alternative communication

I dedicate this thesis to Caden who gave me something to look forward to every Wednesday. Thank you for always keeping me on my toes and reminding me why I want to be an SLP. “See ya later, alligator.”

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"We are all equal in the fact that we are all different." –Unknown

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GLOSSARY

Hippotherapy: The use of horseback riding as a therapeutic or rehabilitative treatment.

Motivators: Something that provides a reason or stimulus to do something.

Augmentative and Alternative Communication: The various methods of communication that can help people who are unable to use verbal speech to communicate.

INTRODUCTION

According to the Center for Disease Control and Prevention (2019), Down syndrome is the most common chromosomal disorder. Approximately one in every 700 babies born annually in the United States has Down syndrome, which equals about 6,000 babies with Down syndrome. The number of babies born with Down syndrome increased approximately 30% between 1979 and 2003 (Center for Disease Control and Prevention, 2019). As the United States moves forward in aiding individuals with intellectual disabilities and providing them with necessary therapies to succeed, it is crucial to document these successes and failures in therapy to learn what techniques and treatments are most promising. While not one case is the same for any disorder, there are common effects that individuals may experience as a result of Down syndrome. Therefore, some treatment strategies may help a wide majority of individuals with this chromosomal abnormality. Providing qualitative chart reviews that show an individual's strengths with proper support contributes to the body of literature in the field. Throughout history, people with Down syndrome have overcome hardships onset by lack of education or research; therefore, it is important to understand the history of this chromosomal abnormality and see what progress has been made.

In 1866, John Langdon Down, an English physician and advocate for people with intellectual disabilities labeled a group of people “mongoloid.” These “mongoloid” people had distinct physical characteristics and decreased intellectual abilities. In 1929, the life expectancy for those who were “mongoloid” was only nine years. Over the next

few decades these people were immediately institutionalized and received care outside the home. In 1959, a French physician, Dr. Jerome Lejeune, identified that this intellectual disability is the result of a chromosomal abnormality, specifically three copies of chromosome 21. The medical community began to use the term Trisomy 21 to describe people with this condition as opposed to "mongoloid." In 1965, the World Health Organization formally accepted the name Down syndrome as the standard terminology and removed the term "mongolism" from most references. The life expectancy of a person with Down syndrome was approximately 15 years in 1970 (Presson et al., 2013). In 1979, research indicated that people with Down syndrome raised at home had a higher IQ than those raised in an institution raising questions of whether institutionalization of people with this chromosomal abnormality is truly beneficial (Bennett and Sells, 1979). Due to increasing research interest in the field, in 1996, the Down Syndrome Medical Interest Group was founded to spread medical information about Down syndrome and promote specialization in the field. This group provides information about comorbidities such as heart defects, hypothyroidism, and hearing impairments in people with Down syndrome. From 2000 to 2014, while funding for the National Instiute of Health increased, funding for Down syndrome-related research decreased to the point where the funding per individual with the syndrome was a mere $45 (Global Down Syndrome Foundation, 2010). Despite decreases in funding, the average lifespan of a person with Down syndrome increased in 2007 to above 45 years and it is believed this dramatic increase is largely due to the end of the inhumane practice of institutionalizing people with Down syndrome (Presson et al., 2013).

Fair and equal treatment of all individuals with intellectual disabilities is a remarkable step for humanity. As the United States moved away from the institutionalization of individuals with Down syndrome, many returned home and those born in following years lead lives at home with family members as primary caregivers. Since the abolishment of institutionalization, many individuals with Down syndrome will learn to read and write, will attend public school, and some graduate college (Whitten, n.d.). This dramatic increase may be attributed to medical advancements and focus on person-centered care. According to a study by Anthony DiLollo and Christin Favreau (2010), research suggests that person-centered care may improve therapy outcomes, client satisfaction, and perceived quality of care. Person-centered care is a therapeutic approach that provides respectful and responsive care catered to an individual's preference, needs, and values, and ensures the patient's values guide clinical decisions (Institute of Medicine, 2001). This type of care ensures that not all cases are treated the same, and an individual and his or her caregivers have a say in fair treatment. Preparing individuals at all stages of life for daily living needs and equipping them to be active members of society is crucial for success. With proper supports such as quality education programs, a stimulating home environment, adequate healthcare, positive familial, caregiver, and community support, people with Down syndrome can develop their full potential and lead fulfilling lives (Central Mississippi Down Syndrome Society, n.d.).

This qualitative case review is unique due to the volume of data compiled from a teenage male who has received speech and language services in one location to address his language abilities. The purpose of this qualitative case review is to investigate the influence of motivators, use of augmentative and alternative communication, and

involvement in hippotherapy activities on communication abilities of a teen with Down syndrome. The following research hypotheses guided the study:

Hypothesis One: Inclusion of motivators during therapy sessions are expected to increase John's ability to remain engaged.

Hypothesis Two: Use of augmentative and alternative communication methods are expected to increase John's expressive communication.

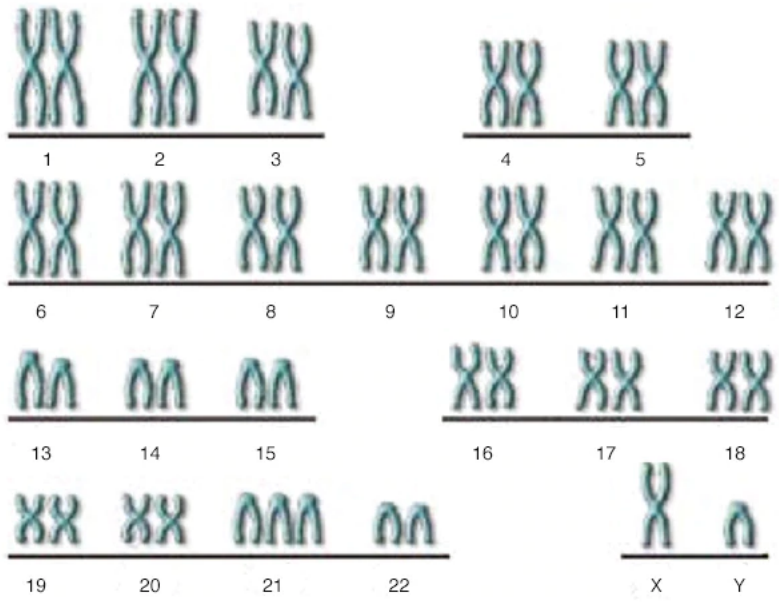
Hypothesis Three: Engagement in hippotherapy sessions (such as grooming, activity requests and responses) using his AAC device are expected to increase John's ability to communicate with a wider variety of communication partners.

LITERATURE REVIEW

Down Syndrome Defined

Down syndrome is a chromosomal defect causing intellectual impairment and physical abnormalities. A typical baby is born with 46 chromosomes, whereas a baby with Down syndrome has an extra copy of chromosome 21. Also referred to as Trisomy 21, the medical term for having an extra copy of chromosome 21, Down syndrome is the result of an error in cell division called non-disjunction. Non-disjunction results in the two chromosome 21 copies' failure to separate. Once the egg is fertilized, the zygote is left with three copies of chromosome 21 resulting in the development of Down syndrome (Center for Disease Control and Prevention, 2019). The addition of this copy of chromosome 21 alters how the body and brain develops. These developmental differences can cause both mental and physical challenges for the baby (Center for Disease Control and Prevention, 2019). Throughout pregnancy, screening tests are administered to establish the risk of the baby having Down syndrome. Once risk is established some families are given the option of receiving a prenatal diagnostic test to establish whether the baby has Down syndrome.

Figure 1. *The Genetic Basis of Down syndrome.*



Note. This figure illustrates the result of trisomy 21 to the genome. As shown, there is an extra 21st chromosome.

Symptoms of Down Syndrome

The symptoms of Down syndrome can vary from person to person, but there are common physical characteristics typical of persons with Down syndrome. These include decreased muscle tone, short neck, flattened facial profile and nose, small head, ears and mouth, upward slanting eyes, white spots on the colored part of the eye (known as Brushfield spots), wide, short hands with short fingers, a single, deep, crease across the palm of the hand, and a deep groove between the first and second toes (National Institute of Child Health and Human Development, 2017). In addition to these physical characteristics, intellectual and developmental symptoms are present. Common cognitive and behavioral problems may include short attention span, poor judgement, impulsive behavior, slow learning, and delayed language and speech development. Although it may take them longer to develop communication skills, most children with Down syndrome

are able to acquire the communication skills they need (National Institute of Child Health and Human Development, 2017). Early intervention of speech and language therapy has shown to be crucial to the success of communication needs for these individuals. Encouraging emphasis on receptive language, expressive language, and speech production throughout an individual with Down syndrome's life has shown to contribute to their communication successes.

Figure 2. *Milestone Chart.*

Milestone	Range for Children with Down Syndrome	Typical Range
GROSS MOTOR		
Sits Alone	6 – 30 Months	5 – 9 Months
Crawls	8 – 22 Months	6 – 12 Months
Stands	1 – 3.25 Years	8 – 17 Months
Walks Alone	1 – 4 Years	9 – 18 Months
LANGUAGE		
First Word	1 – 4 Years	1 – 3 Years
Two-Word Phrases	2 – 7.5 Years	15 – 32 Months
SOCIAL/SELF-HELP		
Responsive Smile	1.5 – 5 Months	1 – 3 Months
Finger Feeds	10 – 24 Months	7 – 14 Months
Drinks From Cup Unassisted	12 – 32 Months	9 – 17 Months
Uses Spoon	13 – 39 Months	12 – 20 Months
Bowel Control	2 – 7 Years	16 – 42 Months
Dresses Self Unassisted	3.5 – 8.5 Years	3.25 – 5 Years

Note. This chart exemplifies the motor, language, and social/self-help delays individuals with Down syndrome may experience in relation to the age typically developing children establish specific skills.

Speech and Language Therapy and Down Syndrome

According to the American Speech-Language-Hearing Association (ASHA), speech-language pathologists are medical professionals who work to prevent, assess, diagnose, and treat speech, language, social communication, cognitive-communication, and swallowing disorders in people of all ages ("Speech-Language Pathologists," n.d.). Speech disorders are the result of an individual having difficulty producing speech

sounds correctly or fluently ("Speech and Language Disorders," n.d.). Language disorders are defined as communication disorders with which an individual has persistent difficulties using or processing language ("Speech and Language Disorders," n.d.). When an individual has trouble with the verbal or nonverbal use of social language, such as difficulty following conversational turn taking, not understanding what is not explicitly stated, and understanding social context, it is defined as a social communication disorder ("Social Communication Disorder," n.d.). Finally, swallowing disorders are a result of feeding and swallowing issues ("What is Speech? What is Language?" n.d.). Individuals with Down syndrome may be impacted by difficulties with hearing, feeding, and language. Speech and language therapy with individuals who have Down syndrome may include working on pre-language skills such as eye contact, turn taking, and attention. Additionally, intervention can help support verbal and non-verbal communication and individuals' language and cognitive development.

Expressive and Receptive Language Defined

Language is the ability to express basic desires and needs as well as to share ideas verbally, nonverbally, or in written form. Receptive language disorders and expressive language disorders are the two major types of language disorders. A receptive language disorder is one in which an individual has difficulties understanding and processing information they receive. Individuals with a receptive language disorder may have difficulty comprehending what people said to them, struggle following directions, and difficulty organizing information. An expressive language disorder refers to when a person has difficulty expressing thoughts, desires, and feelings. The person may have

difficulty combining words, sentences, gestures, or writing to convey a message to others (ASHA, "What Is Speech? What Is Language?" n.d.).

Augmentative and Alternative Communication Defined

According to ASHA (n.d), augmentative and alternative communication (AAC) describes various methods of communications that can help people who have communication difficulties express ideas and feelings. Every individual uses AAC in daily life through facial expressions or gestures with talking. However, some individuals rely solely on this form of communication due to a communication disorder. There are two major forms AAC: unaided and aided. Unaided does not use any form of tool or device, instead implementing gestures, body language, facial expressions, and sign language. Aided systems use tools or devices and are categorized as either basic or high technology. Basic forms of aided communication may include pen and paper or pointing to letters, words, or pictures to communicate a message. An aided system is touching letters or pictures on a screen that produces automated speech. Unaided and aided communication devices can be used in every setting and may be used to supplement verbal communication or replace verbal communication. For this specific case study, American Sign Language (ASL), Picture Exchange Communication System®, Springboard™ Lite and BIGmack switch, and Proloquo2Go™ software were utilized for communication needs.

American sign language with toddlers. ASL is a visual language in which the brain processes linguistic information through the eyes. According to the National Association of the Deaf (2020), the shape, placement, movements of the hands, facial expressions, and body movements are important in conveying information. ASL is often

introduced to toddlers with intellectual disabilities as a basis of communication that language can further be built upon. Research has shown that the use of nonverbal gestures is related to language learning and production in infants and toddlers (Bates & Dick, 2002; Baker-Ramos, 2017; Capirci, Montanari, & Volterra, 1998; Iverson & Goldin-Meadow, 2005;). Children with Down syndrome commonly use ASL to communicate to promote language development (Kumin, 2003). In fact, language advantages found when sign language was introduced in the first two years of life led researchers and clinicians to suggest sign language also be taught to typically developing kids in their first years of life (Acredolo, Goodwyn, & Abrams, 2002; Garcia, 1999).

Picture Exchange Communication System®. Picture Exchange Communication System® (PECS) is an augmentative and alternative communication technique for those who display little verbal communication abilities (Frost & Bondy, 2002). Originally the system was designed for use with young children with autism spectrum disorders, but has since been successfully used with children and adults with various communication and developmental difficulties. This system focuses on communication occurring when the individual approaches their communication partner and delivers a message (Frost, 2002). Three studies following 28 children with Down syndrome ages three to twelve found that the use of PECS successfully increased interaction in individuals with Down syndrome and their peers (Barker, Akaba, & Thiemann-Bourque, 2013; Brady, Thiemann-Bourque, Fleming, & Matthews, 2013; Lorah, 2016). Additionally, these studies reported improvements in language abilities and social communication skills.

Springboard™ Lite and BIGmack. The SpringBoard Lite is a direct selection and scanning device designed to assist communication needs for individuals with

communication or speech disabilities (AbleData, n.d.). A BIGmack is a basic device that allows communication partners to prepare and pre-record a message for the communicator to convey by pressing the large top on the switch. The BIGmack can store a single message up to two minutes in length and provided playback after press activation (Ablenet, 2009).

Proloquo2Go™. Proloquo2Go™ software is a symbol-supported communication application that provides automated speech while promoting growth of communication skills and fostering language development (AssistiveWare, n.d.). This application can be downloaded on an iPad and is often more cost effective since it is an application for expressive language rather than a dedicated device. Additionally, pre-teenagers and teenagers may prefer using the iPad for communication as it may be perceived as more socially acceptable and may lead to decrease the risk of device abandonment (Friedlander & Besko-Maughan, 2019). More readily available speech generating applications are competing with dedicated hardware devices in recent years. These commonplace devices are resulting in a paradigm shift in AAC where these applications are becoming more socially acceptable, affordable, portable and readily available (Hartzheim, 2017).

Clinical Documentation

When clients are seen at the Western Kentucky University (WKU) Communication Disorders Clinic (CDC), various paperwork must be filled out and completed in accordance with the WKU CDC guidelines. Accurate documentation is of high importance because it allows professionals to plan care, facilitate care, and is the foundation of proper coding and billing. Documentation may include Initial Treatment Plans, Initial Assessment Plans, Lesson Plans, SOAP Notes, Diagnostic Reports, and Lesson Plans. These documents provide an overview of clinical experience and progress

that can be reviewed by speech-language pathologists or other healthcare professionals to examine progress and evaluate how to move forward or for billing and insurance purposes to track payments and progress (ASHA, "Module Three: Documentation of SLP Services in Different Settings", n.d.).

Goals and Objectives

When identifying what needs to be targeted in therapy, goals and objectives are created to ensure there is a way to measure the progress made throughout treatment. When writing goals, SLPs are encouraged to make them 'S.M.A.R.T.' These S.M.A.R.T goals are specific, measurable, achievable, relevant and timely. Skills targeted should be clearly described and appropriately attainable by the individual. Goals are the overarching idea of what will be targeted, and objectives are the subcategory of these goals. For example, a goal may be: The client will increase her expressive language to the level of her same aged peers; and an objective under that goal may be: The client will describe age appropriate pictures and objects with 75% accuracy over three consecutive sessions. Working on the objectives should work toward improving the overarching goal. Goals and objectives are an important part of documentation as they outline what will be targeted and the direction of treatment in order to provide clients with the tools of success.

Measuring Goals and Objectives

At the Western Kentucky University Communication Disorders Clinic, progress is monitored by tracking whether an objective embedded within a goal is accomplished, partially accomplished, or not accomplished. An objective that is accomplished meets all criteria stated. An objective identifies the percentage of accuracy and number of

consecutive sessions an objective must be met in order to be deemed accomplished. A partially accomplished objective may be the result of an objective being reached multiple sessions that are not consecutive. Therefore, the client is showing their capability with this skill, they may just need more opportunities to accomplish it. Finally, an objective is left unaccomplished if no significant gains are made toward its completion.

METHODS

"Historical research is valuable in that it often sheds light on long-term outcomes of clinical interventions," (Meline, 2010, p. 163). Initially, the investigator reviewed the client's case files housed in Health Services at Western Kentucky University. Four three-inch binders contain reports from speech and language services spanning twelve years, from age one year, six months to 13 years, eight months. The researcher created a review data sheet so it was systematic in design. Visual examination of record keeping forms used in the Western Kentucky Communication Disorders Clinic was conducted to convert data to see if progress was made. The following historical documents were examined: SOAP notes, Initial Treatment Plans, Lesson Plans, and Final Summaries. Using a plus-minus (+/-) system, the researcher was able to identify when progress was made or not. The plus (+) indicated progress, where the minus (-) indicated no progress, and the plus-minus (+/-) indicated partial progress. After inputting information into this systematic analysis, the investigator looked for therapeutic trends on intervention strategies. Frequency counts were utilized to complete a visual comparison of data across therapeutic techniques. Based on the trends, the researcher compiled a literature review for confirmation of evidence to support the hypothesis. Additionally, the investigator observed the client during horseback riding sessions at New Beginnings Therapeutic Riding to evaluate his communication abilities in a more natural setting than the therapy room. Through this qualitative case review the investigator was able to identify which techniques and AAC were most influential in a positive way on communication.

The mother gave consent to using the son's full name; however, the investigator redacted the right and chose to use the pseudonym "John" in this paper.

RESULTS

Motivators

As defined by Merriam-Webster (1999), a motivator provides a reason or stimulus to do something or can be a person who promotes interest in or enthusiasm for something. Motivators heavily influence individuals of all abilities to complete tasks. Therefore, motivators are heavily used in therapy settings. The following chart indicates categories of motivators utilized throughout John's speech and language therapy sessions and semesters that they were used as indicated in clinical paperwork.

Table 1 Motivators Used During Speech-Language Therapy.

Motivators	Semesters Used
Age appropriate/ adapted books	Fall: 2007, 2009, 2015, 2016, 2018, 2019 Spring: 2008, 2012, 2018 Summer: 2008, 2009, 2010.
Age appropriate toys such as balls, puzzles, blocks, light up toys, musical instruments, play dough, bubbles, mirror, Mr. Potato Head, Ned's Head, fake fruit, magnet board, pop the pig, bouncy balls, bucket game	Fall: 2007, 2008, 2009, 2010, 2011, 2012, 2014, 2016, 2017, 2018, 2019 Spring: 2008, 2010, 2012, 2013, 2015, 2017, 2018 Summer: 2008, 2009, 2010.
Food and snack time: crackers, Gerber Graduate snacks, trail mix, no bake cookies, s'mores, goldfish, and zebra cakes.	Fall: 2007, 2008, 2009, 2010, 2016, 2018, 2019 Spring: 2015, 2018 Summer: 2008, 2010.
Sensory activities/sensory room (therapy balls, giant swing, balloons, trampoline, rice box, sand box, and exercise ball)	Fall: 2010, 2015, 2016, 2017, 2018, 2019 Spring: 2012, 2016, 2017, 2018 Summer:

Music (song book, body parts song, Selena Gomez, Justin Timberlake, rock music, Trolls Soundtrack).	Fall: 2011, 2015, 2017, 2018, 2019 Spring: 2012, 2016, 2017, 2018 Summer:
Visual Schedule/ Schedule Board	Fall: 2014, 2015, 2017, 2018, 2019 Spring: 2015, 2016, 2017, 2018 Summer: 2008,
Crafts	Fall: 2015, 2018 Spring: 2016, Summer:

Note. This table exemplifies the changing motivators of individuals. As seen in the chart above, some motivators remain the same, while naturally, individuals grow and may change preferences throughout their lives.

These motivators fall within seven overarching categories that are broken down into different specific activities. As he grew older, these same motivators could be used but his taste changed and he formed new interests that clinicians tracked in order to provide motivating rewards or activities so objectives could be targeted. Some motivators remained the same and were commonly used in therapy sessions. However, some were only used for a short amount of time or phased out in later years due to changes of preferences that coincide with aging. Seeing these changes identifies the importance of updating and utilizing current motivators to help individuals incentivize completing their work.

Augmentative and Alternative Communication Strategies

Throughout the individual's time at Western Kentucky University Communication Disorders Clinics, he utilized various forms of communication. These modes included verbalization, ASL, Picture Exchange Communication System®, Springboard™ Lite, BIGmack, and the iPad application Proloquo2Go™ software. His progress with

expressive language while utilizing these various forms of communication is shown in Table 2. The investigator measured percentage accomplished, partially accomplished, and not accomplished in order to represent the improvements made while using each device. The investigator chose to include partially accomplished goals to show that progress was being made, even if there was not 100% accuracy. The reason for this is that objetives are made to push individuals to higher success. Although an objective is not accomplished, WKU CDC allows clinicians to mark an objective partially accomplished if the client is close to accomplishing the objective.

Table 2 Forms of Communication and Accuracy Used Throughout Speech-Language Therapy.

Communication Form	Semesters Used	Percent of Objectives Accomplished	Percent of Objectives Partially Accomplished	Percent of Objectives Not Accomplished
American Sign Language	Fall: 2007, 2008 Spring: 2008, 2009 Summer: 2008, 2009	0% (0/7)	86% (6/7)	14% (1/7)
Verbalization	Fall: 2007, 2008 Spring: 2008, 2009 Summer: 2008, 2009	0% (0/6)	83.3% (5/6)	16.6% (1/6)
Picture Exchange Communication System®	Fall: 2009 Spring: 2010 Summer: 2010	60% (3/5)	0% (0/5)	40% (2/5)
Springboard™ Lite / BIGmack	Fall: 2010, 2011, 2012 Spring:2012	60% (6/10)		40% (4/10)

Proloquo2Go™ software	Fall:2014, 2015, 2016, 2017, 2018, 2019 Spring: 2013, 2015, 2016, 2017, 2018, 2019	42% (11/26)	34% (9/26)	23% (6/26)

Note. This table exemplifies the success within each communication form. Documenting this allows clinicians to see what device or communication form gives an individual the most access and success with language abilities.

Additionally, the client's abilities and communication needs changed throughout the years he attended services at Western Kentucky University. Therefore, objectives changed throughout the course of his treatment. As the individual's communication abilities expanded through mastery of objectives, more complex ones were introduced. The following chart shows expressive language objectives targeted using each device through the time the device was utilized with the client.

Table 3. Objectives Targeted During the Use of Each Communication Form.

Communication Form	**Objectives Targeted Over Semesters Utilized**
American Sign Language	- Use sign language to communicate basic wants and needs using the signs more and all done. - The client will use sign language to communicate basic wants and needs using the signs for eat, more, cookies, bubbles, mom, dad, drink, and all done. - The client will imitate 3 out of 10 animal or environment signs. - The client will put together a 2 word/sign combination of "more" once.
Verbalization	- Imitate the phonemes, during isolated, structured play activities. - Client will imitate bilabial patterns during structured play activities 3 times per session - The client will imitate 3 out of 10 motor skills. - The client will imitate 7 out of 10 motor skills.

Picture Exchange Communication System	- The client will present a picture to a communication partner to request and object 10/10 times per session.
Springboard™ Lite / Big Mac	- The client will express himself through the AAC device/ system. - The client will use his AAC device to request objects needed to complete activities. - The client will spontaneously use the AAC device 1 time per session. - The client will identify pictures of nouns using his AAC device 20% above baseline.
Proloquo2Go™ software	- The client will identify pictures of nouns using his AAC device. - The client will spontaneously use AAC throughout the session. - The client will use his AAC to request preferred and non-preferred items throughout the session. - The client will imitate the clinician utilizing AAC 5 times per session. - The client will label a noun or verb using the AAC device. - The client will name objects using AAC 10 times. - The client will request desired objects or activities with the carrier phrase “I Want.” - The client will use two-word carrier phrases. - The client will label actions using AAC. - The client will combine 2-3 words using AAC when commenting or requesting. - The client will identify basic biographical information using his AAC device.

Note. This table indicates the objectives targeted while using each communication form. The reader can view the progression in use of language as well as see how more advanced devices gave John access to more complex communication.

Various forms of communication have been utilized throughout the client's life in order to build upon skills to result in a more advanced form of communication. This case review is intriguing due to the longitudinal view of systematical progression with forms of communication. Clinicians built upon language abilities in order to achieve more sophisticated communication devices and language.

The clinicians began with verbalization in order to see if John was stimulable for intelligible verbal communication. Over the two years verbal language was targeted, he was unable to accomplish any expressive language goals and was noted as unintelligible for most utterances. While working towards verbal expressive language goals, American Sign Language (ASL) was introduced and focus was shifted here to facilitate verbal communication. The clinical decision to provide an alternative form of communication was initiated to boost verbal communication while giving another form of communication. Additionally, ASL was a strong steppingstone for the foundation of language. With a foundation of basic signs that allowed the client to communicate basic needs and vocabulary, the Picture Exchange Communication System® (PECS) was implemented next. This communication form aimed to show John the power of communication through the delivery of picture cards. The cause and effect relationship of this communication form gives the client a motivation to use expressive language. John was able to accomplish objectives using this communication form with hand over hand prompting from clinicians. PECS was abandoned in the Fall of 2010 and the SpringBoard Lite and BIGmack switch were introducted. The Springboard™ Lite provided a more complex speech generating device that gave John the capability to use more complex sentences without an overwhelming amount of icons. Additionally, the BIGmack switch was used simultaneously which allowed him to use a programmed prestored message to answer a question or request.

The Springboard™ Lite houses less icons than the Proloquo2Go™ software application. The Proloquo2Go™ software application on John's iPad was introduced in the Fall of 2014. This application allows users to have folders for categories of content.

Therefore, John can have more vocabulary and it is organized for areas of interest and need. Additionally, with more icons he has more language capabilities and can continue working toward more complex expressive language objectives.

Throughout his time in therapy various augmentative and alternative communication were used. This systematic progression allowed for a foundation of language to be built so the clinician and client could work toward a more sophisticated device and advanced expressive language abilities.

Hippotherapy Involvement

The researcher observed John at New Beginnings Therapeutic Riding to assess his language abilities in various settings. New Beginnings Therapeutic Riding offers horse riding classes to individuals with disabilities. The organization believes that the responsibility of riding, grooming, and leading horses will encourage physical, cognitive, and emotional advancement as well as promote social skills in individuals (New Beginnings Therapeutic Riding, n.d.).

John attended therapeutic riding sessions weekly at the horse barn in Bowling Green, Kentucky. In conversation, his mother expressed the joy he expresses at these sessions. Additionally, his mother became very involved in this organization after seeing the benefit it had on her son’s communication and social interaction. John followed a routine at these sessions. First, he would enter the building and sit in the waiting room where he could talk with same aged and ability peers, as well as their parents. When the session began, a volunteer would retrieve him and they went to the horse's stall. Upon arriving to the horse's stall, John would begin the grooming process. Throughout the grooming process, the volunteer would ask him which brushes he needed, how many

strokes he would brush it, which side he was brushing, and had other conversation about horse information. John had the opportunity to use his Proloquo2Go™ software application to answer these questions and continue with the grooming process. After the grooming was complete, he would prepare the horse for riding by expressing what equipment was needed with help from the volunteer and retrieving it. Next, he was asked to indicate he was ready to mount the horse. After using the AAC device to indicate this, he was ready to participate in various activities while riding the horse around. Activities on the horse included directing the horse to different sides of the barn, matching color coordinated rings, and directing the horse using "woah" and "go." While on the horse, a volunteer would walk alongside holding his iPad, which stores the Proloquo2Go™ software application on it. Volunteers and instructors would ask questions that had prestored answers in his AAC. Throughout the session John was given the opportunity to use the Proloquo2Go™ software application to participate in conversation with peers and activities. This experience allowed John to interact with same aged typical peers, same ability peers, many communication partners, and motivation to use the communication device.

Through observation of interaction, John was eager to verbalize "woah" and "go" to direct the horse. The motivation to care for his horse and direct it during activities increased his use of expressive communication whether it was verbally, using Proloquo2Go™ software, or using ASL. The staff and volunteers at the barn were trained communication partners who utilized wait time when waiting for a response from John. Additionally, a clinician from the Western Kentucky University Communication Disorders Clinic taught staff and volunteers how to navigate through the Proloquo2Go™

software application. This short explanation allowed staff to understand how to prompt John during activities when necessary. Accessible communication partners allowed the communicator many opportunities and supports when communicating at the barn.

DISCUSSION

Motivators

Motivators are the basic influence of human interactions. Every individual has a motivation for his/her actions; this is a basic need for all individuals. It was noted in a study by Wishart, that the "natural" learning style of children with Down syndrome is characterized by the following: an increasing use of avoidance strategies when faced with learning new skills, a growing reluctance to take the initiative in learning contexts, and an over-dependence on/misuse of social skills in cognitive contexts (2001). It was noted in SOAP notes and final summaries that as John grew older, when he would become disinterested in an activity he would not participate in the activity or sign "bathroom" in order to leave the therapy room for a break. John had been attending these services since he was approximately a year and a half old; he had enough experience to understand how to avoid unwanted tasks. However, with the proper use of motivators and stimulating activities John could be more involved and invested in activities if they appealed to his interests.

John's chart of motivators is broken down into seven overarching motivators used: age appropriate/ adapted books, age appropriate toys, food and snack time, sensory activities, music, visual schedule/ schedule board, and crafts.

Age appropriate books and adapted books were used to engage John in story time and allowed clinicians to follow up with questions that assessed his ability to understand the story read. As John began using augmentative and alternative communication, the use

of adapted stories was introduced for him to follow along with the reading. According to Beukelman and Mirenda (2005), there is an importance of participation for individuals using AAC and they further discussed opportunity and access barriers to this participation. Individuals who utilize AAC may not be exposed to story time with books typical same aged peers may read; however, creating or accessing adapted versions of these books can benefit those who use AAC and their inclusion.

Age appropriate toys and food and snack time were two of the most used motivators. According to previous research studies, children tended to work faster when they expected to earn a reward (Lepper, Green, & Nisbett, 1973). These two motivators were embedded within activities such as structured play time and making snacks. The reward would then become free play time or eating the snack. His interests in toys and snack preferences changed throughout his time in therapy but toys and snacks were still influential motivators consistently utilized. This also applies to music and crafts. Craft activities were used to target direction tasks and the motivation of creating the craft increased willingness to participate. Music rewards were given after a certain activity or number of tries was completed. The motivation of watching a music video John enjoyed, dancing to his favorite song, or sitting and listening heavily influenced the completion of activities.

In the fall 2015 semester, the clinician incorporated sensory breaks within the lesson plan. Sensory breaks included fidget toys and the sensory room where John could bounce on balls and trampolines or swing. Sensory breaks motivated John to work through his tasks for a stimulating reward. It was noted that these sensory breaks contributed to his success and have been utilized in every following semester.

Schedule boards provide a proactive way to give structure to individuals throughout their day and therapy sessions. According to Volmer (1995), typical and atypical students can benefit from clear and predictable daily schedules. John's recent schedule boards included pictures of activities that were to be completed and once they were accomplished, he removed them from the "to-do" side and placed them under the "done" side. Once he completed the task and placed it under the done side, he earned a reward. The schedule board allowed him to visualize what he needed to complete in order to get free time to listen to music, play with toys, have a snack, or play with sensory toys.

Although motivators are not the only contributor to his success, it is evident that when motivators and engaging activities were embedded in therapy sessions, John was more willing to participate and did not request bathroom breaks or other stalling methods.

Augmentative and Alternative Communication Strategies

Verbalization and American Sign Language. When John first began attending speech and language services at Western Kentucky University, his goals began with learning basic American Sign Language (ASL) and practicing the production of phonemes. For the next few semesters, he increased his ASL knowledge adding basic age appropriate signs needed for communication and worked on motor imitation skills. ASL was not introduced to terminate verbalization but to supplement verbal communication and build a foundation for language. According to Fristoe and Lloyd (1977), one of the two purposes of manual communication serves is to be a temporary means of communication used until vocal communication is established and then faded out. Initially, clinicians introduced ASL to accompany verbal communication. However,

verbalization did not increase for John and additional means of communication were attempted. John could have continued to learn ASL as his primary form of communication. However, the use of PECS or a speech generating device would give John more access to communication with others since they would not have to have previous knowledge of ASL.

Picture Exchange Communication System®. In the fall of 2009, the Picture Exchange Communication System® (PECS) was introduced in which he was able to meet his goals but only with hand over hand assistance. However, the next semester he did not make any progress with the PECS system when prompts began to fade. In the following semesters, PECS was abandoned due to 60% accuracy that was achieved using maximum prompting. According to Smith, Hand, and Dowrick (2014), PECS can be successfully used to increase interaction among individuals with Down syndrome and their peers. Additionally, PECS is beneficial for introducing the weight symbols hold in communication. Frost and Bondy (2002) indicate the importance that PECS teaches the cause and effect relationship of exchanging or displaying symbols to a communication partner. PECS is an important part of this systematic progression of augmentative and alternative communication due to the teaching of the importance of cause and effect relationships of symbols.

Springboard™ Lite and BIGmack. Using the Springboard™ Lite and BIGmack, John was able to communicate basic wants and needs with moderate prompting. The Springboard™ Lite is intended for entry-level users and can display five, eight, 15 or 36 icons at one time (AbleDate, n.d.). He was easily able to utilize these devices and showed language capabilities that could be better equipped with more advance communication

devices. With success on this entry level device, John was able to move forward towards a more sophisticated communication system.

Additionally, this introduction of a speech generating device was beneficial for John's social interaction. Research from Chung and Carter (2013) shows that with training on speech generating devices, peers can more accessibly communicate with their same aged atypical peers who are utilizing these devices. Rather than having to learn how to manually sign or dissect unintelligible speech, a brief training on a speech generating device can open doors for same aged peer interactions and promote communication among them.

Proloquo2Go™. Next, the advanced high-tech communication software, Proloquo2Go™, was introduced on his iPad system. With the introduction of the Proloquo2Go™ software, he made significant gains in his expressive communication. Goals and objectives relating to expressive language using Proloquo2Go™ software were fully accomplished 42% of the time and partially accomplished 34% of the time. Although 23% of the time objectives were not accomplished, 77% of the time significant gains were being made to his expressive language. Additionally, more advanced language goals were targeted with the Proloquo2Go™ software due to mastery of topics he had been working on for consecutive semesters using different forms of communication. Notably, he was able to work toward stringing two- to three-word phrases together, express biographical information, and master precise labeling objectives. Some of these goals were targeted with previous devices and further accomplished using the Proloquo2Go™ software. His level of prompting and cueing was decreased as he targeted new objectives and he was partially accomplishing or accomplishing most goals. There

were two semesters of plateau in the spring 2016 and fall 2016 semesters. Although plateaus occur, they do not represent ceilings on development and individuals with Down syndrome can continue to achieve communication goals (Paul, 2006, p. 112). John exemplified this evidence proving that after two semesters of plateau, he was able to make progress toward expressive language the following semesters through accomplishing objectives identifying nouns.

The Proloquo2Go™ software targets conversational needs of teens and adults with the Advanced Communicator Level of the application. These advanced levels of verbs, adjectives, and adverbs will assist users in advanced spoken and written communication they may experience in older years. It is expected that individuals using this level are middle school aged and older. Therefore, this system is targeting communication needs of older AAC users (Bruno, 2015). This is consistent with the fact that this application allowed John more advanced communication than other previously used devices.

AAC success. "The principles of AAC are built around the physical usability of the systems and the various types of symbols that will meet the individual's current communication needs. It is through assessment results, plus trial-and-error work, that the best system is developed for everyone. A variety of choices and decisions need to be made for each AAC system," states Fogle (2008, p. 734). The systematic progression of augmentative and alternative communication that John's caregivers and clinicians implemented allowed him to achieve what he has today in relation to communication. According to Fogle, "Beyond generic messages that most AAC devices use (yes and no, hi, bye, please, thank you, eat, drink, happy, sad, TV, and video), individuals vary the

message and wording they need and prefer" (2008, p. 737). John was able to create a foundation for language to build upon and as more sophisticated devices have been introduced, he has been able to expand his expressive language abilities. Therefore, he has outgrown devices with generic messages to which Fogle is referring. With the more sophisticated communication application, Proloquo2Go™ software, he can perform previously learned skills as well as expand his communication skills through working towards stringing together longer word phrases, requesting preferred items, and discussing basic biographical information. Proloquo2Go™ software currently works for his communication needs as it gives him access to a sophisticated communication device for which John has worked to build a language foundation.

Hippotherapy involvement. Literature suggests that children with disabilities learn best in natural environments with typically developing peers (Allen & Cowdery, 2005; Brown, Hemmeter, & Pretti-Frontczak, 2005). Additionally, Jung suggests that two important strategies for intervention include maximizing natural learning opportunities using everyday activities that individuals experience and embedding intervention in daily routines (Jung, 2003). New Beginnings Therapeutic Riding provided John a place where he could participate in recreational horseback riding with trained staff who assisted him throughout his session. During John's session, two other riders with similar abilities had sessions and same aged typical peer volunteers assisted him throughout sessions. This recreational activity allows children with disabilities to utilize their forms of communication in a natural setting to enhance communication.

For building communication development in individuals with an intellectual disability, Mirenda and Beukelman (1992) recommend: providing structured

opportunities for practice within routines, in natural contexts, offering opportunities for making choices, teaching skills which allow "beginning communicators" to introduce and establish topics of conversation, and providing assistance for receptive language (i.e. pictorial schedules). This setting allowed communication partners to assist communication development using these recommendations. Every session the structured routine of grooming was utilized to give opportunities for practice. As discussed in the results, John would answer questions and identify tools used and the number of brush strokes utilized. Additionally, volunteer staff at the hippotherapy sessions embedded opportunities for choice making in the grooming routines and choice of gear. John was able to choose which brush he was going to use first and what gear he would be using on his ride. The AAC application was always accessible; even when on the horse, volunteers would walk alongside and hold his device in place for use. Pictorial schedules were heavily used throughout the session to assist John's receptive language. First,/Then charts were utilized as well as pictorial schedules for grooming the horse. Additionally, using AAC in the natural environment promotes the client's generalization of communication skills (Glennen & DeCoste, 1997). Therefore, practicing these skills in a comfortable and motivating environment can contribute to the success of the individual's communication.

According to Beukelman and Mirenda (1992) the availability of a communication partner is as important to the success of a communication intervention as is the availability of an appropriate access system. At these hippotherapy sessions, John could interact with several communication partners. He interacted with two same ability individuals who are attending sessions at the same time. Using their speech generating devices and verbalization, they all greeted each other when entering the lobby. The

parents of everyone communicated with the three males waiting for their session as well. The parents understood appropriate ways to communicate with these individuals and used wait time to allow them ample opportunities to respond with their speech generating devices and asked questions about motivating topics. Increasing communication opportunities focused on motivating topics encouraged the client's communication and participation in activities and conversation.

At New Beginnings Therapeutic Riding, they also focused on creating a sense of community that allowed individuals to become comfortable within the environment. Staff implemented different theme days that allowed the individuals to dress up and gave more communication opportunities. The focus on community gave the riders a place to feel comfortable and eased the pressure of communication. John has been given access to communication partners such as same age typical peers, similar ability peers, and adults.

John's engagement in hippotherapy sessions using his AAC increased his abilities to communicate with a wider variety of communication partners. Additionally, his time at New Beginnings Therapeutic Riding allowed him the opportunity to increase confidence and self-esteem through caring for the horse and interaction with ample communication partners.

CONCLUSION

Through the qualitative chart review of John's treatment at Western Kentucky University, the investigator was able to confirm the hypothesis that the inclusion of motivators attributed to the success of this individual. Motivators were heavily used to influence and encourage the individual to work towards objectives that further advanced their expressive communication abilities. Additionally, the use of augmentative and alternative communication methods increased John's expressive communication. Through building a language base using American Sign Language and systematically progressing to a more sophisticated device, John was able to achieve more complex expressive language goals. The investigator was also able to confirm the hypothesis that engagement in hippotherapy sessions using his AAC device increased John's ability to communicate with a wider variety of peers. Overall, the use of motivators, systematic progression of AAC and involvement in hippotherapy contributed to the success John is currently experiencing with expressive language.

The trial and error of communication devices contributed to communication gains with the client. Although the clinicians were not the ones to suggest the different modes of communication, they provided person-centered care that was catered to the individuals needs and objectives. This focus on developing skills and training the individual on the use of the device contributed to John's success greatly. He is now able to work toward a more advanced objective since finding a device that suits his current needs. Finally, through observation at New Beginnings Therapeutic Riding the investigator was able to

confirm the hypothesis that this recreational activity contributed to his communication success. Horseback riding was an area of interest and using language in this setting was desirable to John. Therefore, John was highly motivated to use his AAC device and occasional verbalization. This device use promoted carryover from sessions into a natural environment which encouraged device use. The inclusion of motivators, systematic progression of communication forms and recreational involvement has greatly contributed to John's communication success.

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