

The Effectiveness of the High-Tech Speech-Generating Device with Proloquo2Go App in  
Reducing Echolalia Utterances in a Student with Autism

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### **ABSTRACT**

This study was conducted to determine the effectiveness of using the high-tech speech-generating device with Proloquo2Go app to reduce echolalic utterances in a student with autism during conversational speech. After observing that the iPad device with several apps was used by the students and that it served as a communication device, language aid, and memory aid, the researcher decided to research the effectiveness of using Proloquo2GO app in reducing echolalia. This action research study used a single-subject alternating research design to evaluate the effect of Proloquo2Go app on echolalia. Data was collected first by using an observation of behavior analyzed for antecedent, behavior and consequences, then by recording the number of echolalic utterances, and finally by conducting an interview with the student's cooperating teacher. The results proved that there was a higher number of echolalia produced by Peter in sessions without the AAC intervention when compared to sessions with AAC intervention. The results support the use of Proloquo2GO app to decrease echolalic utterances.

### **The Effectiveness of the High-Tech Speech-Generating Device with Proloquo2Go App in Reducing Echolalia in a Student with Autism**

Imagine an elementary classroom of four students diagnosed with Autism Spectrum Disorder (ASD) between the ages of nine and eleven. All of the students have complex communication needs. Both communication and social skills are the most primary areas of difficulty where my students are struggling. Ashley (not her real name) is a student who has unique needs and challenges when it comes to communication skills. Ashley is non-verbal and is using signs and limited verbalizations to communicate. Thomas is verbal and can use complete sentences. He has difficulty with articulation and grammar. Peter is verbal, but typically uses two to three word phrases to communicate. He has difficulty with asking and answering questions appropriately. David is verbal, but he typically uses single words to communicate; however, he can use phrases with prompting. In addition, David has sensory perception issues. For example, he is sensitive to certain sounds including some kinds of music. Peter, Thomas, and David all use echolalia at times. For instance, Peter repeats utterances from a “Sing Along Songs” video during a group calendar activity. With all of these behavioral and communicative issues occurring at the same time with these students, I wonder how the teacher could help to promote and improve their communication skills. What could the teacher do to alleviate these struggles that can conflict with the student’s ability to learn?

For students with ASD, enhancing communication skills is an important part of the student’s educational plan. The failure to communicate effectively usually leads to behavior problems such as a temper tantrum or aggressive behavior that also may have an impact on the quality of life, and the failure to communicate effectively may also negatively affect the students'

performance and prevent the delivery of evidence-based interventions (Howlin et al., 2004). Numerous effective intervention strategies for students with ASD have been described in recent studies (Krcek, 2015). Over the last several years, the intervention strategies for students with ASD have advanced with essential changes in the way services are delivered (Krcek, 2015). These important changes have been facilitated, in part, through technological advances and modalities. Computer-assisted therapies were used with individuals diagnosed with ASD nearly 30 years ago. With the advent of the iPad®, some applications have been designed for individuals with ASD. These apps have many interactive benefits that may hold a student's interest because of their interactivity, and it can improve the functional communication skills for students with ASD (Caron et al., 2004).

It was observed that the iPad device with several apps was used by the student, and it served as a communication device, language aid, and memory aid. The purpose of this research was to determine the effectiveness of using the high-tech speech-generating device with Proloquo2Go™ app to reduce echolalic utterances to an elementary student diagnosed with Autism Spectrum Disorders during the conversational speech. Therefore, the research question was as follows: How does the high-tech speech-generating device with Proloquo2Go™ app reduce echolalia utterances for Children with Autism Spectrum Disorders?

The researcher's hypothesis was that if the student uses a high-tech speech-generating device with Proloquo2Go™ app, then his echolalic utterances will reduce.

### **Literature Review**

Research on interventions that improve communication skills for verbal and non-verbal students with autism is not extensive; however, research on using an augmentative and alternative communication device on reducing echolalia in a verbal student with ASD is more

novel. This current study provides a review of the literature of three important themes including autism, communication and language intervention strategies for autism, and Proloquo2go™ app.

### **Autism**

Autism Spectrum Disorder (ASD) has been one of the most prevalent developmental disorders worldwide (Boyle et al., 2011). ASD is a type of pervasive developmental disability that notably had an increased incidence (American Psychological Association, 2013). "The Individuals with Disabilities Education Act provides an educational operational definition of autism... Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child's educational performance" (Simpson et al., 2004, p. 3). Children with autism show a significant difficulty in three areas: social interaction skills, language and communication skills, and repetitive range of activities (APA, 2013). Some common characteristics exist among children with ASD. The Individuals with Disabilities Education Act provides other common characteristics associated with ASD; for instance, individuals with ASD experience difficulty when engaging in a new activity; they show repetitive activities, stereotyped movements, and uncommon responses to sensory experiences (Simpson et al., 2004). In addition to what has been stated in IDEA's definition, children with ASD show many difficulties in language. "Children with autism may contribute limited information to a conversation; however, the information may be irrelevant and demonstrate the use of a phenomenon called echolalia... echolalia involves a repetition of utterances or phrases produced from another speaker or media, such as TV shows or cartoons" (Valenzuela, 2013, p.2). Several fields of social work assistance can be extended to people with autism such as community-based housing, medical, education and psychological

services, and training and employment (National Association of Social Workers, 2006).

Standardized criteria have been provided by the American Psychiatric Association (2013) as written on its Diagnostic and Statistical Manual, 5th Edition:

There are several phenomenological characteristics associated with autism, which are not included on the Diagnostic and Statistical Manual. These characteristics often differs from person to person but generally, individuals with autism may likely to have these associated characteristics: avoidance of eye contact, failure to show empathy, hypersensitivity to sensory stimuli, self-motivational behavior such as hand flapping, tremendous desire for similarity or routine, unique speech patterns or intonations, want for less sleep, and very limited diet (American Psychiatric Association, 2013).

In order to enhance communication with children with ASD, interventions must be done. Inability to communicate effectively with individuals with autism often results to challenging behaviors such as aggression and temper tantrums that affects their quality of life negatively and hampers the delivery of evidence-based interventions (Howlin et al., 2004).

### **Communication and Language Intervention Strategies for Autism**

Applied Behavior Analysis (ABA) language interventions produce significant achievements for children diagnosed with Autism Spectrum Disorder (Matson et al., 2012). The goal of the communication intervention approaches for ASD is to replace repetitive and unconventional difficulties with functional communication (Matson et al., 2012). Some research involves intervention strategies aimed to decrease echolalia in individuals with autism by using behavioral modification. Valentino et al. (2012) examined the effectiveness of the cues-pause-

point strategy to decrease echolalia and to improve correct responses from a three-year-old child with ASD. The results indicated a decrease on echolalia and increased correct responses. Foxx et al. (2014) also used the cues-pause-point language procedures with two children with autism who showed the use of immediate echolalia. These findings proved that this strategy can be effective in teaching autistic children with echolalia. Recent studies show that a variety of specific intervention techniques can be used for people with autism. For example, constant prompt delays were used to teach three boys aged four years old to respond to various questions (Ingvarsson & Hollobaugh, 2011). Simultaneous prompting is also used to teach three children with autism to respond to certain questions (Leaf, Sheldon, & Sherman, 2010). A similar method called most-to-least prompting was used by Axe & Sainato (2010) to teach preschoolers to follow instructions. In yet another study, asking three autistic teenage boys their response to request items, Murphy & Barnes–Holmes (2010) implemented a matching-to-sample task. All of these unique variations of prompting proved to be effective techniques to enhance communication between individuals with autism and individuals without ASD. Since this group of strategies was constantly studied and perfected by various researchers, these strategies provided the opportunity to put into place more prospectively helpful treatment options.

**Augmentative and Alternative Communication (AAC).** Augmentative and Alternative Communication systems are often used to increase efficient and effective communication with struggling autistic children. Augmentative and Alternative Communication systems include Picture Exchange Communication System (PECS), speech-generating devices, and symbolic language systems commonly known as sign language. The AAC seems to have the greatest effect on communication skills, but constructive impressions were also found on the children's behaviors, social skills, and spelling (Ganz et al., 2012). "Communication is the ability to relay

information and thoughts using a reliable method of expression that produces a mutually understood message intentionally exchanged between two or more people" (Spears & Turner, 2011, p. 19).

**American Sign Language (ASL).** "American Sign Language (ASL) is a complete, complex language that employs signs made by moving the hands combined with facial expressions and postures of the body" ("National Institute on Deafness and Other Communication Disorders," 2014). Vision is the most useful tool of communication for ASL users when they use their hands and facial expressions to communicate with one another ("National Institute on Deafness and Other Communication Disorders," 2014). Since most children with ASD fail to speak and have limited or inarticulate language, it will be more effective to use ASL as a means of communication rather than talking with them verbally. In fact, a recent methodical review suggests that ASL can actually enhance communication for kids with autism (Wendt, 2009). Several researches compare ASL with speech-generating devices. Many of them discovered that ASL allows children with autism to learn how to request items using American Sign Language (ASL), Picture Exchange Communication Systems (PECS), or speech-generating devices. However, these children often learned to request at varying rates and degrees of proficiency within the three modes (van der Meer et al., 2012). In the same study in 2012, van der Meer's group has made a comparison on these three alternative and augmentative communication modes, employing four new children with developmental disabilities whose ages range from six to thirteen. These children were taught to make their request for the desired snacks or toys using ASL, PECS, and speech-generating devices. All of them were able to reach the acquisition criteria for PECS and speech-generating devices; only half of them achieved the acquisition criterion for ASL instruction.



**Picture Exchange Communication Systems (PECS).** Initial attempts in boosting communication skills of people with ASD began in a non-technological manner that utilizes pictures and symbols. This gives PECS its considerable momentum. This type of communication approach was more preferable because pictures are lasting and remain in the visual field for longer processing time. Many studies show the importance of PECS, showing that the use of this system will help to improve the functional aspects of communication and communication initiations in individuals with autism (Ganz et al., 2012). Although PECS has been a useful tool, several barriers should be improved upon such as the number of pictures needed as the child's base language grow and the time spent in creating and storing these laminated images. Furthermore, in using this approach, it will be difficult to sustain the increasing number of images. Teachers cannot keep track of these images and effectively supervise the progress of the child. Because of these concerns and issues of improving technological abilities, AAC has emerged to help tackle the communication challenges that most autistic people are experiencing (Shane et al., 2012).

**Speech-Generating Devices.** Speech-generating devices are being used dramatically as alternative and augmentative communication substitutes for individuals with developmental disabilities who have limited or no spoken language at all (van der Meer et al., 2012). The use of mobile technologies have offered several of potential benefits in enhancing communication that include an increased alertness and social acceptance of alternative and augmentative communication, better user empowerment in contacting alternative and augmentative communication solutions, increased approval of alternative and augmentative communication technologies, greater practicality and communicability, and greater distribution of alternative and augmentative communication research and development (McNaughton & Light, 2013).

Several studies cited forms of therapies available for people with ASD such as those which are computer-assisted that helps in social interaction teachings, enhancing communication, language and reading skills. The therapies also included video modeling that enhances the beginning of communication, response, and vocabulary (Krccek, 2015). ACC devices were designed to substitute printed pictures but were found to be too expensive and often difficult to encode or individualize which makes it inflexible to accommodate needs and denouncing (Shane et al., 2012). At present, many studies report an increase in language skills when AAC technologies were used by children who do not normally speaks (Ganz, et al., 2012). With the invention of iPads, tablets, and smart phones comes the applications which the purpose include playing an interactive game, watching films, and browsing the internet. Some of these applications were especially designed for people with autism such as ABA Therapy Images, All About Me, Augie AAC, Choice Board Maker, Communicating Basic Needs application and Proloquo2go™ (Krccek, 2015).

### **Proloquo2go™**

Initial evidences suggest the value of applications in teaching new skills to people with ASD (Sennott & Bowker, 2009). Some of these strongest initial evidences are in support of the use of an app called Proloquo2Go™ which is a multi-lingual augmentative and alternative communication solution that is available on iPads or iPhones which helps people who have difficulty in speaking or cannot speak at all. It can be modified to suit the needs of a wide variety of users with changeable literacy levels. Featuring natural-sounding voices, speech is produced by tapping buttons with symbols or by typing, using the on-screen keyboard with word prediction (Krccek, 2015). Valenzuela (2013) has demonstrated that the use of an AAC device with Proloquo2go™ app for an eleven-year-old male diagnosed with autism can support the

reduction of echolalia. Several initial researches show the effectiveness of using Proloquo2Go™ on children and young people with ASD to boost communication. Sennott and Bowker (2009) have discovered that Proloquo2Go™ can be used with children who have been diagnosed with ASD in meeting their full daily communication needs, and they also identified Proloquo2Go™ in their “best practices” category for its use of symbols, visual supports, voice output, and ability to support inclusion. In a thesis, King (2011) established that Proloquo2Go™ can enhance the request selection for three children ages three to five with ASD as compared to the Picture Exchange Communication System (PECS). Yet in another thesis, Valenzuela (2013) had reviewed the impacts of a high-tech application Proloquo2Go™ and low-tech application ACC device on reducing echolalia in an eleven-year-old child with autism during an informal speech using a single-case broken treatment research design. The results supported the use of Proloquo2Go™ in reducing echolalic sounds. Moreover, Duncan and Tan (2012) found evidence that supports the use of Proloquo2Go™ as a visual task manager for students with ASD. Roth (2013), as well, found evidence to support the use of the same application in enhancing communication and performance in physical education classes. Another study (Van der Meer et al., 2012) also verified the effectiveness of Proloquo2Go™ in helping autistic students to communicate in a classroom setting.

## **METHOD**

### **Research Design**

The research design that the researcher used for the current study was a single-subject alternating research design to evaluate the use of a high-tech speech generating AAC device on echolalia. Taylor's (2015) study explained the single-case designs as follows:

Single-case designs are a family of research and evaluation designs characterized by the systematic repeated measurement of a client's outcome(s) at regular, frequent, pre-designated intervals under different conditions (baseline and intervention), and the evaluation of outcomes over time and under different conditions in order to monitor client progress, identify intervention effects and, more generally, learn when, why, how, and the extent to which client change occurs (p. 37).

Because a single-subject design is often viewed as the most functional and effective design when measuring behavioral change, the researcher selected that particular design for this study. This study built upon previous research, but it provided a different setting with various choices of activities. During this study, there were two conditions. In the first condition, the conversational sample was achieved with the use of the AAC device. In the second condition, a conversational sample was be achieved without the use of the AAC device. The conditions counterbalanced each session to control for presentation effects.

### **Participant**

This was a classroom with four special education students. The focus of this study was with Peter. Peter was a verbal eleven-year-old male. He had been diagnosed with autism from the time he was three years old. During the course of this study, Peter was in the sixth-grade special education classroom in a local intermediate school of a small mid-western town, USA. The school's demographics included 63.2% Caucasian students, 20.6% Hispanic students, and 11.2% African American students. The school was counted as low-income, with 49.4% of the demographics eligible for free or reduced lunch. Peter received ABA therapy, occupational therapy, and speech/ language therapy for sixty minutes per week.

Peter had excellent school attendance and always turned in completed homework. His handwriting was very neat. Peter listened and followed directions with one or two prompts when needed. Peter's voice, fluency, and articulation skills are within expectancy. Peter's receptive and expressive language skills were below expectancy for his ability as shown on the following standardized tests. Peter received an average score between 85-115 on the Preschool Language Scale-4 (PLS-4). Regarding each individual category, his scores included an Auditory Comprehension standard score of 67, an Expressive Communication standard score of 54, an Expressive One-Word Picture Vocabulary Test (EOWPVT) standard score of 71, and finally, a Receptive One Word Picture Vocabulary Test (ROWPVT) standard score of 75. His total language standard score was 56.

Peter usually used two-three word phrases to communicate, but he is capable of using a complete sentence with prompts. For the social interaction skills and proficiencies, Peter requires prompting to interact appropriately with staff and peers. Peter is participating in a social skills curriculum to increase social awareness.

The researcher chose Peter to be in this study because he had a prime problem with communication skills. As reported by his teacher, Peter demonstrated the use of echolalia, and he had limited verbal skills. Peter had a significant delay in his receptive and expressive language skills and social interaction skills when compared to age-matched peers. As reported by his speech therapist, the receptive and expressive language skills for Peter indicated a significant delay. When compared to age-matched peers, his receptive and expressive language skills level was around that of a four to five-year-old.

## Procedures

The researcher saw Peter twice a week for six weeks. The researcher visited Peter at his school, and sessions were held in his special education classroom area, with studies being conducted while sitting across a table from Peter. An iPad with the Proloquo2go application was used during the sessions in the AAC device condition. A data collection table was used to record every session. Each session took twenty minutes, and many activities were used. Those activities included educational videos from Dave and Ava such as Apples and Bananas, This Little Piggy, and Farm Animals Train, interactive games such as memory and matching games, and children's short stories such as Yummy Yummy story and What Is at the Zoo. It should be noted that before beginning any session, an iPad training was given to ensure that Peter could use the Proloquo2go app. During this training, the researcher asked Peter show-me questions to make sure that Peter could press and point to the vocabulary or picture in the iPad. Using minimal language, the researcher also spent twenty minutes playing several games with Peter because the student needed to be familiar with the researcher and the games.

The iPad was placed in front of Peter on the side where it was easily accessed for sessions that included the AAC device. The vocabulary on the iPad was assessed to ensure Peter could receptively identify the item. The researcher did this by asking the student "show me \_\_\_\_\_" for the basic vocabulary.

Each session was conducted as follows. The researcher organized and conducted each activity. In the AAC condition, Peter was given the short vocabulary assessment, and after that, the activity began. Note, in regards to the presence of the AAC device, Peter was given the device intermittently throughout the activities. In the Non-AAC condition, the activity began

without any instruction.

The short video and short story was presented to the student before obtaining the conversational sample. The conversational sample was obtained during the time that the researcher was playing the game with Peter. Before each session, the researcher prepared two activities. Each set of activities included two similar activities, and the two sets were completed in each session.

The iPad with the Proloquo2go app was programmed to include vocabulary for one of the activities in each set. Pictures corresponding to the word were included with the icon. Examples of vocabulary included for the activities are listed below.

Short story:

Vocabulary from *Yummy, Yummy* children's storybook: Popcorn, Pizza, Jam, Apple, Banana.

Vocabulary from *What Is at the Zoo?* children's storybook: Bear, Monkey, Elephants, Giraffe, Lion

During the current study, a token economy system was used as a motivational and behavior management technique. The token economy system was used during the intervention sessions because the student demonstrates learning and behavioral challenges. The purpose to use this technique was to help to reduce the boredom or satiation for the student due to the availability of secondary reinforcers (stars), and this technique is easy to administer with the use of immediate or frequent reinforcement. For Peter, the token economy involved the awarding of

a reinforcer, an element which is desirable to the student. In Peter's case, it is a cheese ball. Peter periodically exchanged the stars for reinforcers, so the reward (cheese ball) motivated Peter to do whatever is necessary to earn it. Peter earned stars for listening to the story, answering the questions and engaging in the activities.

### **Data Collection**

Data was collected on the number of echolalic utterances and the antecedent, behavior, and consequences when he exhibited echolalic utterances during the baseline, also during the intervention phases, and after the intervention phases were complete. Echolalia was defined as, "When children with ASD start talking, they often begin by imitating what others say, either just after they say it (immediate echolalia), or as a "script" they repeat later (delayed echolalia). Often this talk appears self-directed and is not used for communicative purposes" (Paul & Norbury, 2012, p. 268). During the baseline and after the intervention phases, data was collected using an Antecedent, Behavior, Consequences (ABC) Observation Form (see Appendix A). This method involves recording the environmental variables related to the echolalia. When the echolalic utterances occur, the observer records the target behavior, the antecedent (event that immediately preceded the behavior), and the consequence (event that immediately followed the behavior). The researcher used this method during the baseline and after the intervention phases were complete to identify information regarding the possible function of the target behavior echolalia. In this study, the dependent measure was the number of echolalic utterances from each conversational sample. The researcher calculated the percentage of echolalic utterances by counting the total number of utterances and the total number of echolalic utterances (total number of echolalic utterances/ total number of utterances X 100). The researcher recorded the



results on the Echolalic Utterances Data Collection Table (See Appendix B). This table is a direct observation tool and an interval recording method that helped the researcher to record both the number of utterances and the number of echolalic utterances that occurred in specific time periods. The time was listed on the grid and divided into 10-minute periods. The researcher recorded the exact number of utterances and the echolalic utterances into the cells to provide more detailed information. Finally, an interview with the cooperating teacher was used to gain more knowledge on the student's language and his behavior (See Appendix C).

### **Data Analysis**

Data was examined using an observation of behavior analyzed for antecedent, behavior and consequences, the number of echolalic utterances, and an interview with the cooperating teacher to triangulate the behavior analysis and the frequency data on echolalic utterances.

The observation of behavior analysis was collected for the antecedent, behavior, consequence. The observation data was analyzed by looking for three common themes across the target behavior, including a certain time of day, the activity occurring, and the antecedent observed. The ABC observation chart was used during the baseline and after the intervention sessions were complete in order to identify information regarding the possible function of the target behavior "Echolalia."

The number of echolalic utterances was analyzed for the mean of how many utterances occurred on a conversational sample. The researcher looked at how the percentage of echolalic utterances decreased the more the student used the Proloquo2go app intervention. In this study, the dependent measure was the percentage of echolalic utterances from each conversational

sample. The echolalic utterances data was evaluated by measuring the frequency counts. The researcher was able to calculate the percentage of echolalic utterances by counting the total number of utterances and the total number of echolalic utterances (total number of echolalic utterances/ total number of utterances X 100).

$$\frac{\text{Total number of echolalic utterances}}{\text{Total number of utterances}} \times 100$$

During the last step, the researcher interviewed the cooperating teacher to gain more knowledge on the student's language level and to determine the student's language needs.

## RESULTS

The question this study investigated was how does the high-tech speech-generating device Proloquo2Go™ app reduce echolalia utterances for children with an Autism Spectrum Disorder? The results proved the researcher’s hypothesis that if the student uses a high-tech speech-generating device such as the Proloquo2Go™ app, then his echolalic utterances will reduce. During the data collection, I measured the frequency of Peter’s echolalic utterances. The student used both immediate echolalic phrases and delayed echolalic phrases. Some of the communicative functions of echolalia used by Peter were turn-taking, “yes” answer, providing information and directive as described by Paul & Norbury in 2012. After examining data using an observation of behavior analyzed for three areas involving antecedent, behavior, and

consequences, the researcher found that there were certain times that the rate of echolalic utterances by the student became high. Some of these times included instances when the student was upset, bored, excited, stressed out, or when he was disturbed by other students' noise. From this data, the researcher also found that sometimes when the teacher asked Peter to end an activity, the student responded by using echolalic utterances. Other times, Peter began echolalic utterances randomly and without any prompt or reason. The echolalia was demonstrated by the student throughout the day at various times. The following is an example of ABC observation form as shown in Table 1.

**Table 1. ABC Observation Form**

Antecedent	Behavior	Consequences
During the APA time for Peter, when one other student began screaming and making some aggressive and self-injurious behaviors.	Peter feels upset and he moves from his chair. Then Peter says, "Stop doing that! Stop doing that! Do you want blue smile?" (Echoed from another teacher's previous remark).	The teacher asks Peter to stay in his chair and tells him it is not nice to say that. Then the teacher tries to control the other student's behavior.
At the end of the rewards time, while Peter is enjoying watching Dave and Ava videos by the iPad, the teacher asks Peter to return the iPad back and says it is time for lunch.	Peter smiles and feels excited. Peter says, "It is time for lunch, it's time for lunch." (Echoed from teacher's previous remark).	Peter takes the iPad back to the box and gets ready for the lunch time.

Here the researcher provided the following examples of echolalic utterances produced by Peter during the conversation samples.

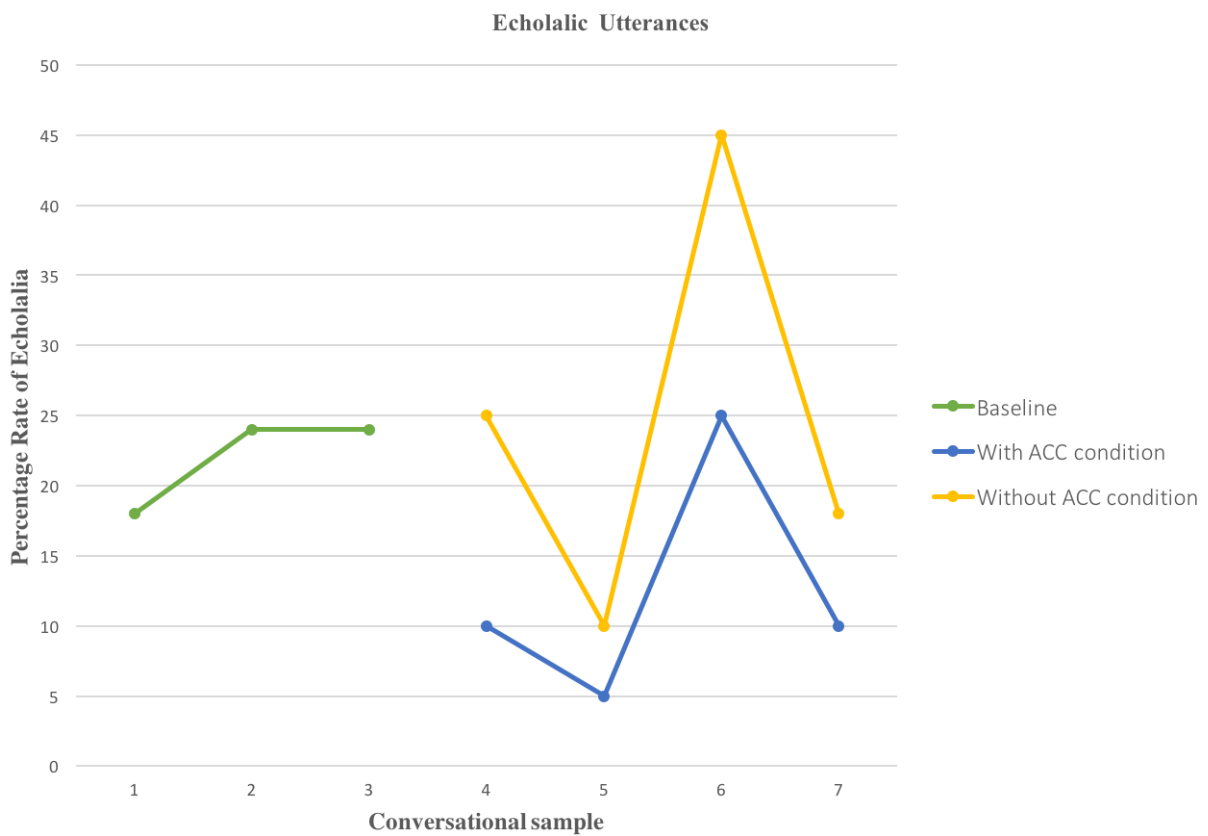
Researcher: What did you see at the zoo?

Peter: Zoo?

Researcher: Did you see the elephants?

Peter: Did you see the elephants?

**Figure 1. Echolalic Utterances**



Generally, the results indicated a decrease of echolalic utterances presented by Peter in the sessions with the ACC condition. The baseline data results collected are documented in the

first three conversational samples (see Figure 1). During sample one, while Peter was shown a children's story, he produced 33 utterances in total with six echolalic utterances, which was calculated to 18%. For sample two, while playing a game, Peter produced a total of 25 utterances with six echolalic utterances, which was calculated to 24%. For sample three, also while playing a game, Peter produced 33 utterances with eight echolalic utterances, which was calculated to 24%. (see Figure 1). The baseline samples one to three demonstrate Peter's pre-intervention rate of utterances with an average of 32% of the time.

For sample four, an educational video from Dave and Ava was used. When given the AAC intervention, Peter produced 20 utterances with two echolalic utterances, which was calculated to 10%. In another session working with Peter using a Dave and Anna video, the AAC intervention was not used. In this session, Peter produced an overall total of 67 utterances with 17 echolalic utterances, which was calculated to 25%. Clearly, when Peter was given the AAC intervention, his number of echolalic utterances dropped significantly.

For sample five, a children's book was read to Peter. Using the AAC intervention, Peter produced an overall of 41 utterances with only two echolalic utterances, which was calculated to 5%. In another session, a different children's book was read to Peter but with no AAC intervention. Peter produced an a total of 20 utterances with only two echolalic utterances, which was calculated to 10%. In this sample, when Peter was given the AAC intervention, he produced fewer echolalic utterances.

For sample six, a different educational video from Dave and Ava was used. When given the AAC intervention, Peter produced a total of 68 utterances with 17 echolalic utterances, which was calculated to 25%. In another session working with Peter using a Dave and Anna video, the

AAC intervention was not used. Peter produced a total of 62 utterances with 28 echolalic utterances, which was calculated to 45%. In this sample, when Peter was given the AAC intervention, his number of echolalic utterances decreased, showing much better results.

For sample seven, a children's book was read to Peter. When given the AAC intervention, Peter produced a total of 20 utterances with two echolalic utterances, which was calculated to 10%. In another session, a different children's book was read to Peter but with no AAC intervention. Peter produced a total of 43 utterances with eight echolalic utterances, which was calculated to 18%. In this sample, when Peter was given the AAC intervention, there was a noted decrease in his number of echolalic utterances.

This finding is consistent with the researcher's results of the interview with the student's teacher and the results of the observation of behavior analyzed for the three areas of antecedent, behavior, and consequences. All data supports the same results.

In summary, it was observed that there was a higher percentage rate of echolalia produced by Peter in sessions without the AAC intervention when compared to sessions with AAC intervention (see Figure 1). Therefore, it was noted that there was a decrease in echolalic utterances produced by Peter during activities with the AAC intervention. Furthermore, these results remain consistent with findings by Valenzuela (2013), proving that the use of AAC device with the Proloquo2go™ app for an eleven-year-old male with autism can reduce utterances of echolalia.

## DISCUSSION

According to the data collected, it is evident from the study that the echolalic utterances produced by the student decreased during activities with the AAC intervention. I have learned that if the student uses the Proloquo2Go™ app to communicate or for an academic task, it would help to reduce the echolalic utterances produced by the student.

An interview with his teacher disclosed that Peter was diagnosed with autism when he was three years old. The student was able to talk using short and specific sentences. As reported by his teacher, “I can have a dialogue with Peter involving functional conversation. For example, when the student wants to go to the bathroom, he can ask using a simple sentence.” The researcher observed that the student says the same thing several times and in the same way, even with the same inflection in his voice. As mentioned by his teacher, Peter says phrases he heard someone else say exactly the same way it was spoken, and Peter imitates phrases spoken by someone on the television, sometimes immediately but, sometimes not immediately after listening to it. On occasion, the repetition of the phrases by Peter occurs for no apparent reason in a random way, and at times the repetition is appropriate. Sometimes, the repetition of phrases occurs by Peter in ordinary moments. As the teacher noted, sometimes if the student feels upset, he says, "Go home, go home." The student's repetition (echolalia) happens several times throughout the day.

It was observed by the researcher that Peter was distracted and he was losing interest when the children's story activity was implemented. Peter needed multiple reinforcements to remain on task. As noted, the percentage rate for the children's story activity with the AAC was 5%, and the percentage rate for the children's story activities without the AAC was 10%. Based

on the researcher's personal judgment, these percentages may suggest that the iPad device with the Proloquo2go app might not aid in decreasing echolalic utterances, and the reduction of percentages could be due to Peter's lack of interest for the story.

Some limitations need to be considered. First of all, this study was conducted using a single-subject research design and involved just one participant. One student individually representing a range of individuals with autism makes it difficult to generalize these findings. In addition, during the current study, the token economy system was used. The researcher has a concern that the student was using the app and engaging in the activity to earn the reinforcer, the reward incentive. This may have had an impact on the results. Furthermore, providing the Proloquo2Go™ app and augmentative and alternative communication devices such as iPad could be difficult for some families or teachers because of the cost.

In the observation notes, it was observed that during the transition times Peter used more echolalic utterances because he was stressed out or felt bored. Also, the times when the researcher would see Peter by himself when the teachers were busy, Peter became bored and his behavior would escalate and get worse. For future research, if I could do this intervention with Peter again, I think I would not only implement the proloquo2go app when I do academic tasks with him, but I would also implement the proloquo2go app with Peter during transition time. Furthermore, future research should involve more participants to generalize and represent other individuals with autism.

In conclusion, by teaching the student to use the iPad with the proloquo2go app, I believe it would facilitate and enhance Peter's communication skills. Through my experience of using the proloquo2go app with Peter, it is my belief that if the student continues to use the



proloquo2go app, his language skills will be improved. Moreover, this app could serve both as an appropriate memory aid and as a language aid for Peter.

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**APPENDIX A**

**ABC Observation Form**

**Student:** \_\_\_\_\_

**Observer:** \_\_\_\_\_

<b>Date</b>	<b>Time</b>	<b>Antecedent</b> What was happening before the behavior occurred?	<b>Behavior</b>	<b>Consequence</b> What happened after?



## APPENDIX C

### Questionnaire to Cooperating Teacher

1. How old was Peter diagnosed with autism?
2. Is Peter able to talk using short sentences?
3. Can you have a dialogue with Peter involving shifts? In other words, they talk, he says, he answers, you talk.
4. Does Peter say the same thing several times and in the same way?
5. Does Peter say phrases he heard someone else say exactly the same way it was spoken?
6. Does Peter imitate phrases spoken by others (present, radio, television) soon after listening to it?
7. Does the repetition of these phrases by Peter occur for no apparent reason?
8. Is this repetition of phrases usually about a specific subject?
9. Does repetition of phrases occur in ordinary moments? For example, when the child is angry when the child is isolated, when the child is afraid, among others.
10. How often is this repetition (echolalia) happening? For example, several times daily, daily, several times a week, weekly and monthly.