



AUTISM SPECTRUM DISORDER SERIES

Action Research Report: Autism, Social Communication, and Pragmatic Skills: A Review of the Literature

By Cathy Ann Lang

This issue of **NASSET's Autism Spectrum Disorder series** was written by Cathy Lang. Autism spectrum disorder (ASD) is a developmental disorder clinically defined by impaired social reciprocity and communication (Gotham, Risi, Pickles, & Lord, 2007). Children with ASD have developmental delays with auditory awareness which in turn resulted in volume control and vocalization deficits. Children with autism spectrum disorder also showed significant deficits in social communication (American Psychiatric Association, 2000). These volume deficits hindered learning and language comprehension and processing in the classroom setting. Speech prosody and volume control can play a role in social communication. This is important because it affects both the components and flow of a conversation. Prosody can be used to indicate affect (Juslin & Scherer, 2005) or "can be the means through which mood, emotion, or personal state is conveyed" (Bellon-Harn, Harn, & Watson, 2007). Social interaction is a necessary component for students' social-emotional success in K-12 settings. It is imperative that students recognize and express many different modes of effective communication using corresponding pragmatic skills. Identifying children's wants and needs through communication and social interactions occurs daily and across all K-12 settings. Understanding the challenges that occur with spontaneous conversation and overall social communication, including the functions of shifting topics and the use of working memory can be challenging. The use of visual supports can be a helpful tool to provide additional time for processing.

Action Research Report: Autism, Social Communication and Pragmatic Skills

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modes of effective communication using corresponding pragmatic skills. Identifying children's wants and needs through communication and social interactions occurs daily and across all K-12 settings. Understanding the challenges that occur with spontaneous conversation and overall social communication, including the functions of shifting topics and the use of working memory can be challenging. The use of visual supports can be a helpful tool to provide additional time for processing.

Statement of the Problem

Students with ASD are often characterized by deficits in social communication, notably in the area of spoken language. Naturalistic and Developmental Social Pragmatic (DSP) interventions are described as being useful in assisting children with autism becoming more socially engaged. Naturalistic interventions are those that teach skills in a more relaxed setting; they used direct prompting and reinforcement within the environment to build on specific social skills (Ingersoll, Meyer, Bonter, & Jelinek, 2012). "DSP interventions are largely based on the social pragmatic model of language acquisition" (Bruner, 1983).

The purpose of this action research study was to explore the effects of using visual cues, specifically, a hand signal (raising a hand when the volume level was inappropriately elevated) during conversations and social interactions in a classroom setting to decrease the overall volume of vocal outbursts across all settings with a student with ASD. Educators understand and recognize the disruption that this behavior can have on the student with ASD as well as on the peers in the student's classroom. These factors can impact the quality of learning for all students. It is necessary to increase auditory awareness of vocal volume to decrease loud vocal outbursts in the classroom. This also impacts the student's overall social development (making and keeping friends, participating in group and classroom activities, communicating needs and wants effectively). These conditions may make students with ASD more accepted by their classmates and to allow these children to become more academically engaged.

Context

The action research was conducted in varied classroom settings in a high school, from the general education classes to elective classes. The student was a ninth grade female with ASD. The ASD teacher was responsible for implementing the strategies and collecting the data. The materials that were used to implement the intervention were a hand gesture, data sheet and a pencil to record the data. The student was given visual cues. The ASD teacher raised her hand when the volume level was inappropriately elevated during conversations and social interactions. The student was taught the meaning of the hand signal before the intervention took place, and the student understood that the hand signal would be used as a visual indicator to reduce vocal volume. The student was asked to lower/modify volume once the hand signal was seen. Parental and administrative consent was given to conduct the research.

Literature Review

Literature in the field of autism spectrum disorders (ASD) supports the premise that students with autism demonstrate a delay in social communication and pragmatic skills. When looking at pragmatic abilities in the area of voice production and auditory awareness, the following studies show there is a delay and disconnect between the two skills. However, individuals with ASD demonstrate specific characteristics and perceptual abilities to be able to effectively interact within their environment.

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Children with ASD often encounter deficits with expressive language, facial expressions and prosody production; making it difficult for them to communicate socially. Their environment can play a key role; more specifically, from a therapeutic/intervention stand point, the natural environment can be used to create opportunities to affect change in their pragmatic skills.

“Pragmatic language as defined by the American Speech-Language Hearing Association (ASHA) is an effective and appropriate use of language to accomplish social goals, manage turns and topics in conversation, and express appropriate degrees of politeness, awareness of social roles, and recognition of others conversational needs (ASHA, 2014)”. Simmons, Paul, and Volkmar (2014) looked at the importance of having an effective tool that assessed exact areas of pragmatic vulnerabilities as part of a clinical assessment. Results indicated that individuals with ASD performed worse overall in comparison to typical peers because deficits in pragmatic skills are highly prevalent in children with ASD.

Young, Diehl, Morris, Hyman, and Bennetto (2005) evaluated two tests to assess language and pragmatic skills. The documented test results were applied in combination with narratives to demonstrate individual competency. The results indicated that children with ASD performed lower in the pragmatic tasks which were presented in the assessment. The Test of Pragmatic Language (TOPL) gave a better overall assessment of the pragmatic skills being tested with the use of social scenarios. Pragmatic skills are a hallmark deficit in children with ASD. Bishop (1989) indicated that children with ASD that experience social impairment, limited recognition of social cues coupled with deficits in understanding, experience a great deficiency in pragmatic language. Assessment tools are still needed in our field to fully understand the complexity of pragmatic language disorders; therefore, it is important that research continues in this area. When evaluating a child with a pragmatic language disorder, volume control and speech prosody are factors that can hinder how a child communicates.

The importance of early communicative vocalizations for later language development is necessary; as impairment in communication is a primary diagnosis of ASD (American Psychiatric Association, 2000). The average age of diagnosis for children with autism is older than 3 years. Vocalization begins to develop in children within the first year of their life and becomes necessary to achieve spoken language.

Plumb and Wetherby (2013) conducted a study that focused on investigating the vocalization of children with autism spectrum disorder in the second year of life and compared it to other areas of development. Vocalization was assessed in 125 children between the ages of 18-24 months with disabilities ranging from developmental delays (DD) to typical development (TD). Results showed that there was a much lower portion of vocalization with the ASD group in terms of their speech sounds. Children with ASD also demonstrated a higher proportion of atypical vocalization when compared to children with TD. Distress vocalization in the ASD group was noted as significantly higher than the typical developing delay groups. The measures of vocalization were collected using the Communication and Symbolic Behavior Scales Development Profile by Wetherby and Prizant (2002).

Another fundamental deficit in children with autism is social communication skills as highlighted in a study by Bellon-Harn, Harn, and Watson (2007). Children with autism have difficulty understanding the literal meaning of language, become fixated on a topic of their choice, and show a lack of interest while others are speaking. The findings of Bellon-Harn et al. (2007) established that an intensive therapeutic intervention, scaffolding, improved language and pragmatic skills; more specifically, the areas of syntax and morphology. The intervention lasted for 3 years and was theme based to enhance student engagement at the task at hand. Individual syllables within each utterance were analyzed for prosodic features of pitch and loudness. The child identified in the study exhibited greater loudness and higher pitch to emphasize stress on a syllable which demonstrated typical prosodic behaviors. However, this did not generalize to spontaneous communication. Similar results were found in a previous study by Baltaxe (1981) who evaluated eight verbal children with autism for prosody using an imitation task.

The findings concluded that children with autism produced speech that was different from their typical developing peers in tempo and rhythm.

Facial expressions and the production of prosody can cause individuals with ASD to have difficulties with social acceptance and how they communicate with others. The intent of Grossman, Edelson, and Tager-Flusber (2013) was to analyze prosody and the production of facial expression in combination with vocal expressions of emotions. Narratives were used to target emotional verbal responses. Evidence was found that differences in nonverbal communication can have a negative impact on the social communication success of children with high functioning autism; resulting in awkward facial expressions. Nonverbal communication is important to the way we view social appropriateness.

Research conducted by Bone et al. (2014) evaluated an interactive relationship between prosodic speech cues of a psychologist and an individual with autism spectrum disorder. In a dyadic interaction, the behavior of one person relies on the other person's behavior (Knapp & Hall, 2009). The speech samples for the study focused on emotions and social difficulties as this evidence is related to an ASD diagnosis. The results of the study showed a significant relationship between acoustic-prosodic features from both individuals. Both the psychologist and the child demonstrated atypical voice qualities such as turn-end pitch slope. However, it was suggested that further research of speech prosody from both partners during spontaneous conversation is needed. The environment in which the child is in can also contribute to more interactive communication and possibly lead to better characterization of prosody in children with ASD (Bone et al., 2014).

According to Tillman, Olguin, Tuomainen and Swettenham (2015), a study was analyzed to determine whether visual perceptual load will have less of an effect on auditory awareness in children with ASD compared to typically developing children. "Perceptual load correlates with the amount of information required to process each unit in order to produce the required perceptual response" (Lavie & Tsal 1994, p.185). The participants in the study performed either a high or low perceptual load on a line discrimination task while an auditory stimulus was played simultaneously with the visual stimulus. The results purposed a greater awareness in the high perceptual load condition in children with ASD than typically developing children. Individuals with ASD experience an overload when there is too much going on around them. They are not able to process information effectively during these high perceptual load conditions. This study suggests that the typical social environment can inadvertently offer high perceptual load conditions which overwhelm them. External stimuli within the environment can play a significant role in planning effective intervention strategies in the life of an ASD child.

The study conducted by Ingersoll, Meyer, Bonter, and Jelinek (2012) was used to compare the effects of a developmental social-pragmatic, naturalistic behavioral, and combined intervention on language and social interaction in five children with autism. The results indicated that all three naturalistic interventions enhanced social interaction. Naturalistic interventions are not designed for instruction, rather for promoting social communication skills within the natural environment (Ingersoll, 2010; Prizant, Wetherby, & Rydell, 2000). They use direct prompting to enhance communication. On the other hand, developmental social-pragmatic (DSP) interventions focus on increasing responsiveness and effectiveness between child and adult (Mahoney & Powell, 1988). The study conducted by Ingersoll, et al looked at both interventions and their effect on language use and social engagement. The emphasis on the DSP intervention was having more spontaneous language that served a purpose. Evidence has shown that DSP interventions promoted joint engagement between the child and adult (Kasari, Gulsrud, Wong, Kwon, & Locke, 2010). Although, there was support that naturalistic behavioral interventions may increase social engagement (Koegel, Vernon, & Koegel, 2009).

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Meadan, Halle, Watkins, and Chadsey (2006) analyzed conversational repair strategies (when a communication partner does not understand or is not being understood, seeks clarification: i.e. what or repeat please) used by two young children with autism. The environment and the development of communication skills play an important role in repairing conversations. Repairing communication breakdowns effectively help children within their environment avoid unexpected behaviors and instead obtain a more desired outcome. The results revealed that the children with ASD were able to sort through the environmental variables that were placed on them to affect their understanding or the lack of not being understood in situations. Both children were able to modify their communication strategies to adjust to the environmental factors that were changing as the study was being conducted. This suggests that environmental factors in a naturalistic environment can be successfully utilized to address communication deficits with children with ASD.

A study conducted by So, Lui, Wong, and Sit (2015) compared typical developing children to those with ASD examining their abilities to understand and utilize hand gestures. The hand gestures used in this research referenced objects or actions that were not physically present at the time of the gesturing. For example, making a gesture indicated a daily activity that had already been done or one that may potentially occur later in the day. This skill is critical for communicating ideas in a conversation. The results exhibited that all children gestured. However, children with ASD gestured less often than the typically developing child. This suggested that children with ASD were less able to effectively utilize gestures and rely on their use of visual-spatial skills to reference a non-present object. These findings were considered when deciding on using hand signals as my intervention strategy in order to access the stronger learning modality.

Data from the literature review supports the need for future research that is essential to increasing communication and pragmatic skills in children with ASD. Their lack of expressive language skills hinders these individuals socially. Therefore, designing an intervention that is suitable in a naturalistic setting to increase auditory awareness and make individuals conscious of their prosody production is essential to promoting more appropriate social engagement for individuals with ASD.

Action Plan/Methods

Name: Cathy Lang	School: Jupiter High School
Research Question(s): How effective will a hand gesture (raising left hand up) be as a visual indicator to reduce volume control for a child with Autism Spectrum Disorder?	
Intervention: <i>Describe the intervention you will implement to accomplish the outcomes you seek for your students?</i>	

The intervention was a hand gesture. The support facilitator raised her left hand when the student was called upon by the classroom teacher. At that point, the intervention was used as an indicator for the student to reduce her vocal volume. The visual cue was implemented in the child's natural environment across varied classroom settings.

Data Collection: *Describe the specific approaches you will use to collect data before, during, and/or after your intervention. You need to "triangulate" your data; thus, you need at least 3 different data sources (e.g., tests, observations, interviews). Also, be specific about what each data source measures (e.g., you are using a test that measures reading comprehension or using observation to tally bullying behaviors). Next, describe the type of data that you obtain with each source (e.g., scores from a test of subtraction facts or a frequency of bully events observed).*

Data Source 1: Before implementing the intervention, the student was observed and data was recorded on how often her vocal volume was inappropriately elevated during the first week. This observation was used as a baseline. At the end of the five weeks in which the intervention was in full effect, a post test was given. This observation was used to determine if the visual indicator was successful.

Data: The student was observed to see how many times per class period she exhibited the behavior.

Data Source 2: During the second week, the teacher introduced the intervention to the student. The student was taught the meaning of the hand signal before the intervention took place. The student understood that the hand signal would be used as an indicator to reduce her vocal volume.

Data: Frequency recording was used to calculate the total number of opportunities that the student independently controlled volume level given visual cue, controlled volume level when prompted, or showed no response after visual cue was presented during intervention implementation.

Data Source 3: The teacher observed the student in her natural setting without the use of the intervention and provided the student with a questionnaire to assess whether the student felt the hand gesture helped her to adjust her volume.

Data: Student responses on a questionnaire regarding the intervention

Time Line:

Data collection took place over a seven-week period. Data collection started in January of 2016 and ended in March of 2016.

Timeline

Tasks	Timeline	Resources
Conducted an informal classroom observation and collected baseline data	January 13, 2016 January 14, 2016 January 19, 2016 January 21, 2016 January 25, 2016	1. Data sheet 2. Pencils
Introduced the intervention to the student and taught her the meaning of the “hand signal.” I collected data on the total number of opportunities (frequency) that the student displayed appropriate behavior	February 1, 2016 – February 5, 2016	1. Demonstration of hand signal
Continued to implement the intervention (hand gesture/visual cue) for the following four weeks.	Week of February 8, 2016 Week of February 16, 2016 Week of February 22, 2016 Week of March 1, 2016	1. Data sheet 2. Pencils
Collected post intervention data (frequency/number of times student engaged in elevated vocal volume without the intervention implemented. Collected student data	Week of March 7-11, 2016 March 14, 2016	1. Data sheet 2. Pencils 1. Student questionnaire

Findings, Limitations, Implications

Data Analysis

The data collected for this action research study were analyzed by comparing pre and posttest results from three different sources. The data were visually displayed through graphs and tables to demonstrate the effectiveness of the intervention. The baseline data collected was an informal observation of the student's average use of appropriate vocal volume in a natural setting. The number of opportunities was tallied to display the students' vocal volume level.

The frequency graph represents the student's progress after four weeks of intervention implementation. The graph shows the number of times the student displayed appropriate vocal volume behavior. The student either controlled vocal volume level independently when given the visual cue, controlled volume level when prompted, or showed no response after the visual cue was presented.

The post intervention data were analyzed to demonstrate the improvement, after intervention was implemented, of the average use of appropriate vocal volume in the student's natural setting. The number of opportunities was tallied to display the students' vocal volume level. Also, a student questionnaire using a 4-point Likert scale was used to determine whether the intervention was useful to the student.

Findings

The results of this study were consistent with the research found prior to initiating the intervention. Children with autism spectrum disorder show significant deficits in social communication (American Psychiatric Association, 2000). This intervention allowed the student to become a more effective communicator with the use of appropriate vocal volume and generalize the behavior throughout her day.

Pre and Post Intervention Observations. The results indicated the student's raised volume level decreased from an average of 8.2 out of ten opportunities during baseline to an average of 6.6 out of ten opportunities during post intervention. The students' raised volume level dropped on average by 1.6 when provided with 10 opportunities. The student's appropriate volume level had an increase from 1.8 on average in baseline to 3.4 on average during the post intervention phase which signifies the effectiveness of the intervention as seen in Figure 1.

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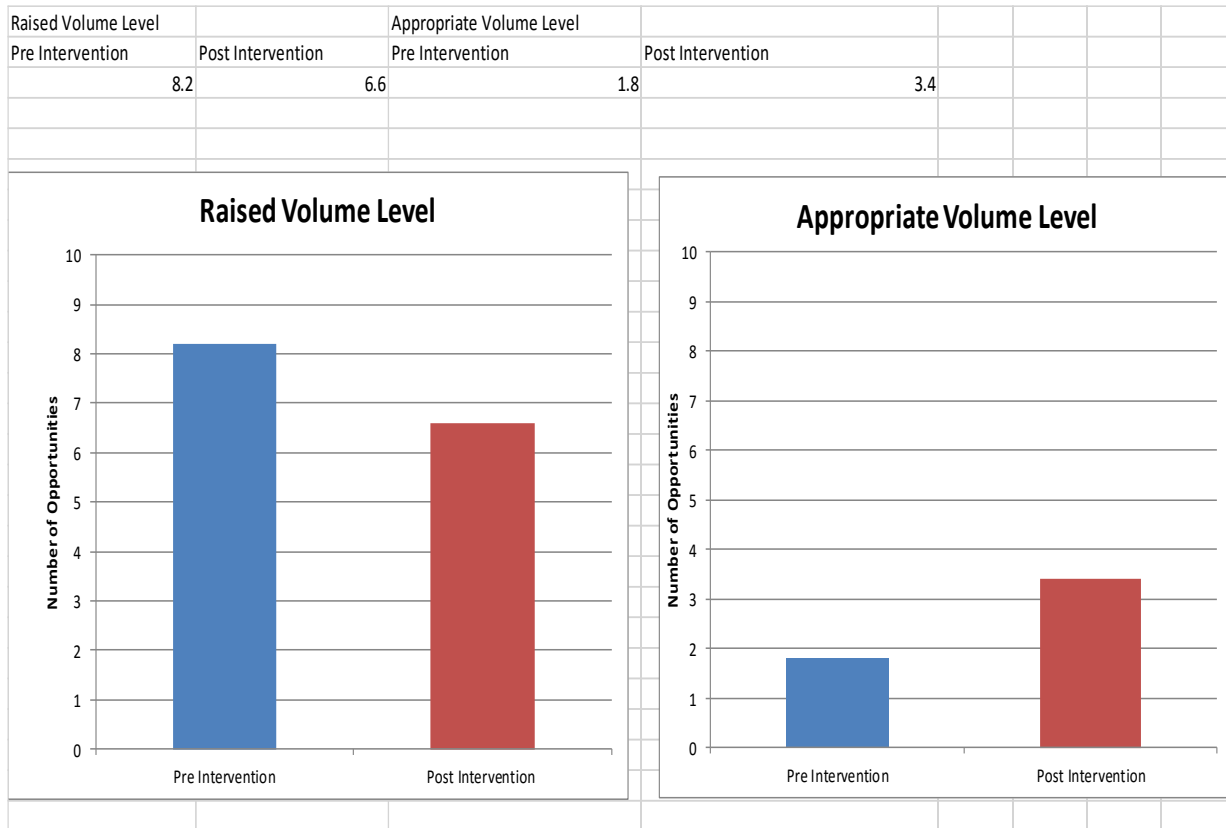


Figure 1. Average number of times the student exhibited appropriate volume level.

Frequency Chart. The results indicate the total number of opportunities given once the intervention was implemented as shown in Figure 2. At the start of the intervention, the student was not successful in responding appropriately to the visual cue. As the intervention phase continued, the student increased her response to the visual cue from 0 out of 10 opportunities to 4 out of 10 opportunities. Given the prompted cue, the student increased her appropriate vocal response from 4 out of 10 to 6 out of 10 opportunities. After being provided with the visual cue and prompted cue, the student demonstrated a decrease in “No response” from 6 out of 10 opportunities to 0 out of 10 opportunities. This shows that the intervention was successful in helping the student maintain her appropriate vocal volume within her natural setting.

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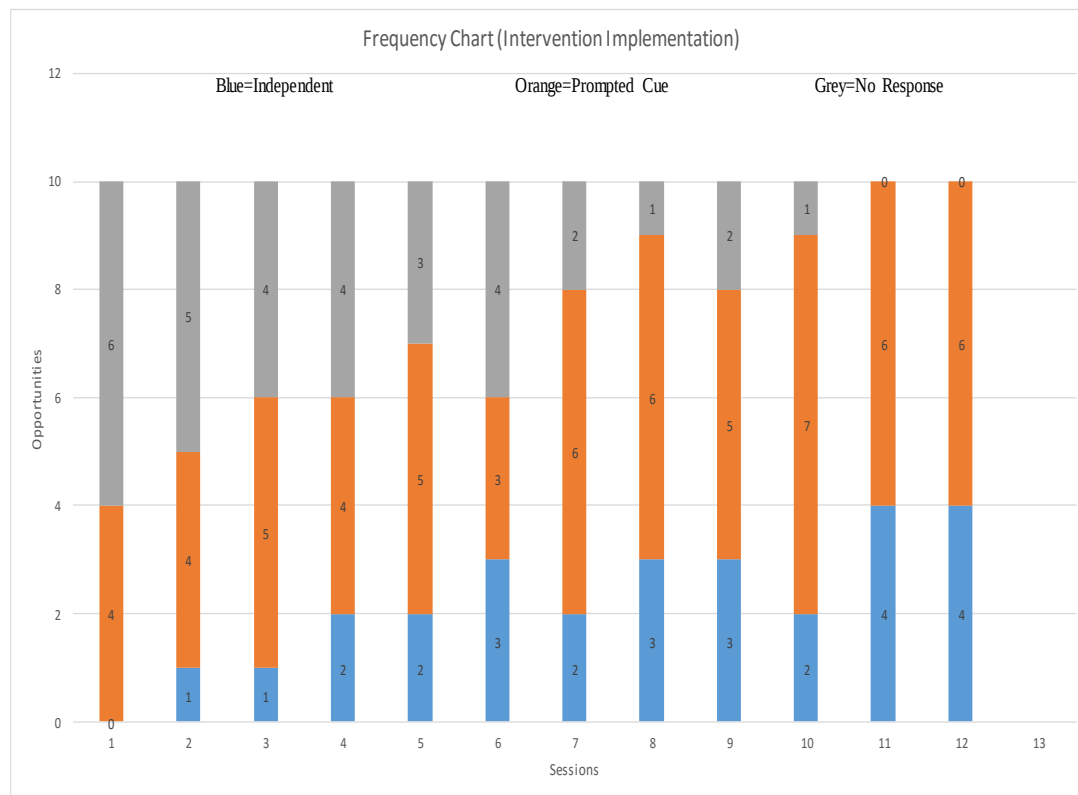


Figure 2. Total number of opportunities given once intervention was implemented.

Student Questionnaire

A Likert scale was used to determine if the intervention was useful to the student in maintaining a decreased vocal volume when interacting with others across all settings. The student was provided with five questions and could earn 1 to 4 points depending on response. For example, when the student was asked if the hand gesture signal was discreet enough within the classroom setting, the student indicated “yes” which earned her 4 points. The student scored 16 out of 20 possible points which reveals a positive outlook on the intervention by the student as seen in Appendix A.

Limitations

There were circumstances that affected the outcome of the results. The length of the intervention was limited from eight weeks to seven weeks. This was due to being pulled out of the classroom for state testing, LTM (learning team meeting) days and other school responsibilities. Therefore, it is difficult to know whether greater gains could have been achieved during a longer intervention period. Data had to be collected three days per week instead of five days due to these circumstances. There could have been different results had there not been any interruptions. In addition, the teacher who collected data was not the teacher on record in the classroom; therefore, the teacher had to rely on the other teacher to be present during the time the intervention was implemented. The sample size presented a limitation as well as the sample was comprised of only one student.

Implications

A lack of expressive language skills is an implication that affects children with Autism Spectrum Disorder. A deficit in these skills can hinder these individuals socially. Therefore, designing an intervention that is suitable in a naturalistic setting to increase auditory awareness and make individuals conscious of their prosody production is essential to promoting more appropriate social engagement for individuals with ASD.

Dissemination

The results of this intervention have been shared with school administrators and the ESE department. The findings from the study were also discussed with the ASD teachers and the Speech and Language Pathologists together as the study focused on Autism, social communication and Pragmatic skills. Additionally, results of the study were shared with Florida International University (FIU) graduate students during an annual South Florida Education Research Conference.

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National Association of Special Education Teachers

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About the Author

Cathy Lang has been an Exceptional Student Education teacher for twenty-one years. She received a Bachelor of Arts degree from Salve Regina University, and in December 2016, she received a Master of Science degree in Special Education with an emphasis on autism from Florida International University. She and her husband of five years, also an educator, share a passion for teaching children with special needs. Cathy also has a love of tennis, and she and her husband have been coaching the sport together for over a decade.

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Appendix A

Student Questionnaire

Instructions: Please put an "X" in the box that correctly answers how you feel about each question	No (0)	I don't think so (1)	Perhaps (2)	I think so (3)	Yes (4)	Points
1. Did you feel that the hand gesture signal was discreet enough within the classroom setting?					X	4
2. Would you have preferred the classroom teacher to have given the hand signal?		X				1
3. Did you feel the intervention (hand signal) was effective in getting you to decrease your volume level?					X	4
4. Would you have preferred to receive the hand signal throughout your verbal response				X		3
5. Did you feel that the intervention (hand signal) helped you increase your ability to self-correct your volume while outside of school?					X	4
Total:						16

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Appendix B

Administrative consent for action research



Daniel S. Frank
Principal

Jupiter Community High School
500 N. Military Trail
Jupiter, FL 33458
Phone: 561-744-7900
Fax: 561-744-7978

January 4, 2016

To Whom It May Concern,

I give permission for Cathy Lang to complete her action research at Jupiter High School with one of her students. Mrs. Lang understands that she is not allowed to disclose the name of the student, nor the name of the school on any documents or presentations.

If you have any questions, please feel free to contact me at (561) 744-7900.

Thank you,

Daniel Frank
Principal



Partnered with



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Appendix C

Parental consent for action research

January 4, 2016

To Whom It May Concern,

I give permission for Cathy Lang to complete action research with my child. Mrs. Lang understands that she is not allowed to disclose the name of the student on any document or presentation.

Parent name _____

Parent signature _____

Thank You,

Cathy Lang
ASD Support Facilitator