

Illinois State University ISU ReD: Research and eData

Theses and Dissertations

2-23-2015

Stakeholder Perspectives of the Effectiveness of Augmentative and Alternative Communication Techniques in Children with Autism

Daria Constantinescu

Illinois State University, daconst@ilstu.edu

Follow this and additional works at: <http://ir.library.illinoisstate.edu/etd>

 Part of the [Speech and Hearing Science Commons](#), and the [Speech Pathology and Audiology Commons](#)

Recommended Citation

Constantinescu, Daria, "Stakeholder Perspectives of the Effectiveness of Augmentative and Alternative Communication Techniques in Children with Autism" (2015). *Theses and Dissertations*. Paper 320.

This Thesis and Dissertation is brought to you for free and open access by ISU ReD: Research and eData. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of ISU ReD: Research and eData. For more information, please contact ISUREd@ilstu.edu.

STAKEHOLDER PERSPECTIVES OF THE EFFECTIVENESS OF
AUGMENTATIVE AND ALTERNATIVE COMMUNICATION
TECHNIQUES IN CHILDREN WITH AUTISM

Daria A. Constantinescu

69 pages

May 2015

The purpose of this study was to utilize focus groups and individual interviews to investigate the effectiveness and efficiency of augmentative and alternative (AAC) techniques in facilitating language in children with Autism Spectrum Disorder (ASD) as expressed by the opinions and attitudes of stakeholders involved in the process. ASD is a disorder that affects an individual's social and communication skills that usually surfaces within a child's first three years of life. There have been numerous studies conducted comparing different types of AAC intervention systems, but there is little information on stakeholders' opinions. The current study utilized one focus group interview with five members. This group consisted of speech-language pathologists (SLPs) who have had children with autism and who use AAC on their caseload. The researcher also conducted four additional interviews; two with teachers who classrooms contained children with autism who used AAC and two with parents of children with autism. Several trends were found in this study. Trends arose that indicated that there was a decrease in behavior problems with an increase in communication with the use of AAC. Another major trend that arose was the need for more support of AAC-use from parents and teachers in order

to aid in the generalization process. There was also a need for more AAC training for SLPs.

STAKEHOLDER PERSPECTIVES OF THE EFFECTIVENESS OF
AUGMENTATIVE AND ALTERNATIVE COMMUNICATION
TECHNIQUES IN CHILDREN WITH AUTISM

DARIA A. CONSTANTINESCU

A Thesis Submitted in Partial
Fulfillment of the Requirements
for the Degree of

MASTER OF SCIENCE

Department of Communication Sciences & Disorders

ILLINOIS STATE UNIVERSITY

2015

STAKEHOLDER PERSPECTIVES OF THE EFFECTIVENESS OF
AUGMENTATIVE AND ALTERNATIVE COMMUNICATION
TECHNIQUES IN CHILDREN WITH AUTISM

DARIA A. CONSTANTINESCU

COMMITTEE MEMBERS:

Ann R. Beck, Chair

Heidi Verticchio

Jennifer Friberg

Yun-Ching Chung

ACKNOWLEDGMENTS

I wish to thank my advisor, Dr. Ann Beck who graciously provided guidance, motivation, enthusiasm, and expertise to make this thesis possible. Thank you for encouraging my research and for allowing me to grow through this process. Appreciation is extended to those who participated in the focus groups. Special appreciation is expressed to the remaining committee members, Mrs. Heidi Verticchio, Dr. Jennifer Friberg, and Dr. Yun-Ching Chung. Thank you all for offering your time and support in the completion of this thesis.

A special thanks to my family. Words cannot express how grateful I am for all your prayers and encouragement. I would also like to thank all of my friends and cohort who supported me in writing and encouraged me to strive towards my goal. Lastly, I would like to express thankfulness to my future husband, Kyle, for his endless love and support in all my endeavors; present and future.

D.A.C.

CONTENTS

	Page
ACKNOWLEDGMENTS	i
CONTENTS	ii
TABLES	iv
CHAPTER	
I. INTRODUCTION	1
Purpose of the Study	2
Research Questions	3
II. REVIEW OF THE LITERATURE	4
Autism	4
Communication	4
Behavior	5
Augmentative and Alternative Communication	6
AAC Techniques and Use with Children with ASD	9
American Sign Language	9
Baby Sign Language	12
Picture Exchange Communication System	14
Speech-Generating Devices	18
Use of SGDs with Children with ASD	20
Total Communication	22
Studies Comparing AAC in Children with ASD	23
Evidence-Based Practice Applied to AAC	27
Stakeholders' Opinions and Perspectives	29
Conclusion	30
Purpose of the Study	31
III. METHODOLOGY	32

Focus Groups and Interviews	32
Informed Consent Process	34
Participants	34
Materials	35
Procedure	35
Data Analysis	37
IV. ANALYSIS OF THE DATA	39
Transcription Agreement-Indexes	39
Agreement Indexes for Major Themes Overall	39
Agreement Indexes for Major Themes by Group	40
Subthemes for SLPs	40
Subthemes for Teachers	44
Subthemes for Parents	48
V. SUMMARY & CONCLUSIONS	51
Summary of the Study	51
Summary of the Findings	51
Limitations of this Study and Future Directions	53
Conclusion	54
REFERENCES	59
APPENDIX A: Written Parental Consent Forms and Verbal Assent Scripts	65

TABLES

Table		Page
1.	Major themes with greater than 20% response rate arising from SLP responses; 5 total	56
2.	Major themes with greater than 20% response rate arising from teacher responses; 2 total	57
3.	Major themes with greater than 20% response rate arising from parent responses; 2 total	58

CHAPTER I

INTRODUCTION

Autism is a neurodevelopmental disorder that affects an individual's ability to communicate and respond appropriately to the external world and usually surfaces within a child's first three years of life (Autism Society of America, n.d.). A majority of toddlers with Autism Spectrum Disorder (ASD) have delays that occur across multiple areas of development like nonverbal problem-solving skills, motor skills, and receptive and expressive language skills (Chawarska, Klin, Paul, & Volkmar, 2007). Children with ASD may exhibit aggressive behaviors including biting, kicking, hitting, and tantrums due to their limited ability to communicate. These behaviors often restrict their access to learning opportunities, their participation in a wide range of activities (Keen, 2003), and the development of functional communication skills.

Individuals who do not have functional communication skills are considered to be eligible for Augmentative and Alternative Communication (AAC) systems. AAC is an intervention approach that can play multiple roles in communication development, including stimulating the development of speech (Ronski & Sevcik, 2005). AAC training can also provide an important foundation for language development and be used as a tool to increase social participation. The overall goal of AAC is to assist individuals with communication disorders to communicate effectively by enhancing their current mode of communication (Beukelman & Mirenda, 1998). There are many AAC techniques that can be implemented in treatment of children with ASD. Those discussed in this study include:

American Sign Language (ASL), Baby Sign Language, Picture Exchange Communication System (PECS), Speech-Generating Devices (SGDs), and Total Communication (TC).

Evidence-based practice (EBP) is an important approach to clinical practice that puts emphasis on the importance of integrating comprehensive research evidence into the decision-making process. The three prongs of EBP are the research base, the clinical expertise of professionals providing service, and the perspectives of stakeholders. The views of direct and indirect stakeholders, meaning the individual using AAC, as well as family, caregivers, and friends, are of relevance because they are a major component of the EBP approach (Schlosser & Raghavendra, 2004). These individuals are strongly impacted by all decisions relating to AAC intervention and communication. Given this fact, stakeholder opinions are held to be valuable.

Purpose of the Study

AAC intervention may benefit individuals with developmental disabilities who have significant speech and language impairments by providing a method to communicate. Since 25% of children diagnosed with ASD may not develop functional speech in adulthood, this is a population with whom speech-language pathologists (SLPs) work to develop functional communication (Volkmar, Lord, Bailey, Schultz, & Klin, 2004). The purpose of this study is to investigate the effectiveness and efficiency of AAC techniques in facilitating language as expressed by the opinions and attitudes of stakeholders involved in the process. Specifically, what are stakeholders' perceptions of the advantages and challenges to the use of AAC with children who have

autism? Furthermore, what are the similarities and differences between these perceptions of various groups of stakeholders?

Research Questions

Focus groups and individual interviews were conducted as an effective technique to measure stakeholder perspectives. The specific questions asked to the teachers and SLPs by the moderator were: (a) what is your experience with AAC?, (b) what are the greatest issues in the selection of AAC with children with ASD?, (c) what are the greatest challenges faced with AAC intervention and generalization of skills?, and (d) what support have you received throughout this process? Potential follow-up questions consisted of: (a) what processes do you use to select AAC components for children with ASD? (b) Do you use a team approach?, and (c) who are the key players on the team? Questions for parents consisted of: (a) which AAC system does your child use and why?, (b) what was the biggest issue in the selection of AAC?, (c) in your experience, what have been the largest challenges, as well as joys, regarding your child's use of AAC?, (d) did you feel like your opinions were included in the process of selecting an AAC technique for your child?, (e) what support did you receive during this process?

CHAPTER II
REVIEW OF THE LITERATURE

Autism

Autism is a highly variable neurodevelopmental disorder that affects an individual's ability to communicate and respond appropriately to the external world. The Centers for the Disease Control and Prevention reported Baio's findings that prevalence of autism had risen to 1 in 88 births in 2008 in the United States (Baio, 2012). Autism is a complex developmental disorder that usually surfaces within a child's first three years of life (Autism Society of America, n.d.). A majority of toddlers with Autism Spectrum Disorder (ASD) have delays that occur across multiple areas of development like nonverbal problem-solving skills, motor skills, as well as receptive and expressive language skills (Chawarska et al., 2007).

Communication

One of the main characteristics of ASD is impaired social interaction and communication. The American Psychiatric Association (2000) describes autism as manifested by a delay in, or total lack of, the development of spoken language. Autism is distinguished not by a single symptom, but by multiple impairments relating to social interaction and communication (Filipek, Accardo, & Baranek, 1999). Many experts estimate the current proportion of children with ASD who are nonverbal to be between 20% and 30%. Additionally, approximately 25% of children diagnosed with autism may not develop functional speech and remain mute in adulthood (Volkmar et al., 2004).

Behavior

Because of the limited ability to communicate, individuals with ASD may exhibit aggressive behaviors including biting, kicking, hitting, and tantrums. These behaviors often restrict their access to learning opportunities and their participation in a wide range of activities than typically developing children (Keen, 2003).

It is suggested that children with autism at the prelinguistic or early word stage are more likely to experience communicative breakdowns but may make fewer attempts to repair the breakdowns and may use less sophisticated strategies (Keen, 2003). Brady, McLean, McLean, and Johnston (1995) stated “repairing communication breakdowns may decrease frustration and thereby decrease aberrant behavior if the repaired communication is responded to by the communication partner” (p. 1345). It is therefore important to provide alternative methods of communication to decrease instances of communication breakdowns and increase avenues to communicate effectively. Thus, a variety of AAC systems can be introduced to facilitate the receptive and expressive language skills of children who are experiencing spoken communication difficulty.

The positive effect of increasing communication modalities on behavior can be seen in Kee, Casey, Cea, Bicar, and Bicar, 's (2012) single-subject study of a 28-year-old man with autism. This study is a prime example of the use of American Sign Language (ASL) as an AAC method to assist in requesting food and drink, but also to decrease behavior issues (Kee et al., 2012). It was important to teach the participant the correct signs to mand (request) because of his use of idiosyncratic signs that differed from ASL. The signs he used were very similar in form to one another, which didn't allow for the caregiver to accurately determine what he was requesting. This resulted in

the participant engaging in destructive and self-mutilating escape response behaviors until the desired object was provided.

Following the baseline and intervention phase in Kee et al. (2012), the participant's escape response decreased from 35% to 10% across the duration of the intervention. This decrease indicated that he was associating signing a preferred item with the receipt of the desired item. Further along in the maintenance phase, this escape response had decreased to a range of 10% to 0%. This decrease occurred as independent mands increased to 100%. Kee et al. (2012) remarked that "frustration was rarely seen as the mands increased, as is evident by the descending trend of escape responses" (p. 124). Results like this demonstrate the importance of teaching individuals with autism with behavior problems an effective method to communicate with others.

Augmentative and Alternative Communication

One of the greatest challenges faced by educators and SLPs who work in school settings is how to provide communication supports to students with autism (Mirenda, 2003). It is estimated that one third to one half of children and adults with autism do not use speech functionally (National Research Council, 2001). Individuals who do not have functional communication skills, like those with ASD, are considered to be eligible for AAC systems.

According to the American Speech Language Hearing Association (ASHA, 1989), AAC is "an area of clinical practice that attempts to compensate (either temporarily or permanently) for the impairment and disability patterns of individuals with severe expressive communication disorders" (p. 107). An AAC system includes rules for combining symbols to create messages that are maximally intelligible and

comprehensible for the broadest audience of communication partners (ASHA, 2004). The use of AAC is an intervention approach that can play multiple roles in communication development, including stimulating the development of speech. These diverse roles may have the effect of improving a child's communication skills which, in turn, may allow for greater independence and participation in daily activities (Ronski & Sevcik, 2005).

The overall goal of AAC is to assist individuals with communication disorders to communicate effectively by enhancing their current mode of communication. Other goals include giving the individual who uses an AAC method the ability to be able to a) communicate in conversations, b) participate in various environments, c) learn language, d) carry out roles in social environments, and e) fulfill daily needs and wants. It is important to realize that often messages communicated by the individual using AAC are meant to accomplish more than one of these goals (Beukelman & Mirenda, 1998).

AAC systems are not just devices; they include many other methods of communication for different potential listeners. One way of categorizing AAC techniques is by whether they are unaided or aided. Unaided communication does not require any equipment that is external to the body and may involve the use of symbols such as manual sign, verbal imitation, and gestural techniques (Mirenda, 2003). Interventions using aided communication incorporate devices that are external to the individuals who use them and may include variations of picture-pointing, like communication boards, speech-generating devices (SGDs, also known as voice output communication aids or VOCAs), and computer technology. Most individuals requiring AAC use a combination of unaided and aided communication techniques, depending on the context and communication partner (Beukelman & Mirenda, 1998).

Millar, Light, and Schlosser (2006) conducted a systematic review to determine the significant benefits of AAC on enhancing the communicative competence and promoting of language development of individuals with developmental disabilities. In their review, the positive effects of AAC intervention on speech production were observed across children and adults, ranging in age from 2 years to 60 years. “Positive effects were also observed across a range of AAC intervention approaches, including highly structured, clinician-directed instruction grounded in behavioral theory and child-centered approaches implemented in play contexts” (Millar et al., 2006, p. 257). For most of the participants in their analysis, the gains in speech production were observed shortly after the introduction of the AAC intervention. The data collected for their analysis supported the theory of automatic reinforcement, which suggests that AAC and natural speech should increase in frequency when AAC is presented along with speech and followed by a reinforcer.

Romski and Sevcik (2005) suggest that AAC interventions should be introduced before communication failure occurs. AAC training can provide an important foundation for language development and be used as a tool to increase social participation. SLPs with limited AAC knowledge can therefore play a leading role in identifying and treating children who may benefit from AAC. SLPs who have limited knowledge of AAC systems may also refer individuals who need AAC to service providers with the appropriate expertise. SLPs can provide a broad range of speech, language, and feeding/swallowing services to children with disabilities, along with initiating and providing AAC intervention services using low-tech communication boards and simple digitized devices. However, SLPs may need to refer children who require more complex

technology to AAC experts. SLPs in integrated practice may be the primary service providers for AAC intervention only after the expert AAC assessment has been completed and the appropriate equipment has been obtained (Beukelman, Yorkston, & Garrett, 2007).

AAC Techniques and Use with Children with ASD

AAC interventions can benefit individuals with developmental disabilities who have significant speech and language impairments by enhancing their communicative competence (Millar et al., 2006). Because the lack of expressive language is often the most obvious symptom and cause for concern for toddlers who are diagnosed with autism, differing AAC techniques may need to be implemented with these children to encourage expressive language (Tincani, 2004). It is difficult for clinicians to choose the most effective intervention for an individual child with ASD given the plethora of communication-training strategies available. It is also difficult due to recent advancements in technology and the rapidly evolving field of AAC within the last 10 years. Variability in language outcomes for children with ASD also makes it difficult to predict which child will develop speech and which will require the use of AAC (Flippin, Reszka, & Watson, 2010). The efficacy of different AAC techniques used with children with ASD is reviewed below.

American Sign Language

Sign language can be beneficial to teach because signs are symbolic for representing objects and actions in a child's world in order to motivate children with autism to make requests and comment upon objects. ASL is a language that contains phonology, morphology, semantics, syntax and pragmatics. ASL is also a visual

language, so the information is expressed not with the combinations of sounds but with combinations of hand shapes, palm orientations, movement of the hands, arms and body, and facial expressions (Kent, 2004). Signs are less transient than words and for children with autism, gestures and signs may be easier for SLPs and parents to prompt than verbal productions.

Sign languages use space as a grammatical and semantic device. For example, in ASL the noun assigned referring to a particular person or object can be assigned to a location in space, typically to one side or the other of the signer. Referring back to that place in space by pointing to it then acts as an anaphoric pronoun (Kent, 2004, p. 339).

Carbone, Sweeney-Kerwin, Attanasio, and Kasper (2010) conducted a study to determine the effect of manual sign training combined with prompt delay and vocal prompting on the production of verbal production in non-verbal children with developmental disabilities. The study was comprised of three participants who attended a private school serving mostly children with developmental disabilities. The participants were children who failed to demonstrate functional verbal speech. Tony was a 4-year-old boy with autism who manded for 15 items with manual signs without physical or gestural prompts when a desired item was present. Ralph was a 4-year-old boy with Down syndrome who manded for 10 items with manual signs without physical or gestural prompts when a desired item was present. Nick was a 6-year-old boy with autism who had weak manual signing and required partial physical prompts or full physical prompts to produce signs.

The instructor selected six target mand items for each participant based on a pre-experimental assessment that indicated what objects the participants were motivated to have such as edible items, toys, and movies. The sessions consisted of 50 trials twice a day in each participant's classroom during which the target items were presented randomly. Each trial began with the instructor presenting the desired item to the participant at eye level to signal the availability of the reinforcement. If the participant declared motivation for the item, through looking at it or reaching for it, but did not emit a manual sign mand within five seconds, the instructor would initiate a prompt sequence for the manual sign that began with a gestural prompt. If a gestural prompt was not effective in inducing the sign, the instructor provided a physical prompt two seconds later. The instructor would not deliver the reinforcer item if the participant emitted only a vocal response without a manual sign. The instructor would then initiate the prompt sequence for the manual sign. This was to ensure that verbal responses were not strengthened independent of a manual sign.

Carbone et al. (2010) found that the treatment produced an increase in the number of verbal responses that accompanied the manual sign mands for all participants. Overall, the findings of this study support the hypothesis that prompt delay and vocal prompting can be implemented with manual sign language to produce an increase in functional communication in children with developmental disabilities who emit few vocal responses.

Factors that affect the use of ASL. It is important to take into consideration whether the client has any other developmental delays which would impact not only motor abilities, but language development in general. Imitation skills are essential to the

learning of sign language. Imitation in children displays the developing ability to construct internal representations of the behavior of others and to duplicate them. To imitate physically, the individual must be able to perform tasks such as turn-taking, attending to the action, and replicating (Owens, 1996). Sometimes, as these physical imitation skills are taught, imitation of speech sounds and simple words can be addressed at the same time.

Another factor affecting ASL acquisition is the child's sensory integration skills. Sensory integration refers to the method the nervous system uses to receive, organize and understand sensory input. This enables individuals to figure out how to respond to environmental demands based on sensory information, such as auditory and visual input (Miller & Lane, 2000). In those who have sensory integration problems, senses may be either over- or under-reactive to stimulation and, thus, not conducive to sign language training

Additionally, because functional communication is the goal, sign language has a restricted set of potential communication partners. Only those who have learned and are familiar with the language can communicate with those who use ASL (Wilkinson & Henning, 2007).

Baby Sign Language

Baby sign language is defined as a method using hand shapes and motions to convey words and meanings to a pre-verbal infant. These hand shapes and motions are executed typically using simplified ASL. Baby sign language is composed of hand and finger signs that indicate words, concepts, and ideas babies need and want to communicate. Some examples are signs for words like "more," "hungry," "milk,"

“sleepy,” etc. Baby sign differs from ASL in that baby sign is a limited number of "stand alone" signs taken from ASL that relate to desire or needs. The signs are also modified to increase the ease for the toddler to manually create the signs. The main motivation to teaching an infant baby sign language is the hope that this special type of communication will significantly reduce frustration for the child when it comes to communication (McNeill, 1998). The main justification for teaching baby sign language to an infant is that there is often a gap between the desire and actual ability to communicate. This gap may lead to frustration, tantrums, and possible future behavioral issues (Acredolo & Goodwyn, 1990).

When using baby sign language, it is strongly recommended to say the sign out loud so the child can not only see what the sign is, but also hear what the spoken word sounds like, which therefore encourages verbal communication (Acredolo & Goodwyn, 1990). Research on baby sign language has found that teaching baby signs improved cognitive and emotional development. McNeill (1998) comments that baby sign language does not slow down speech, but actually increases the rate of language development, as well as increases the parent/child bond at the same time. When infants successfully demonstrate the use of a gesture before they can speak the corresponding word, they are displaying that much of the underlying work of learning and encoding that word has been done. This demonstrates their understanding of not only the concept or category the gesture stands for, but it demonstrates they recognize the string of sounds as equivalent to the gesture. Lastly, they have figured out the symbolic function of the sign as it applies to language (Goodwyn, Acredolo, & Brown, 2000). This may be beneficial to children

suspected to have ASD because teaching baby sign language can act as a precursor to teaching ASL if the child is diagnosed early to be nonverbal.

Picture Exchange Communication System

The Picture Exchange Communication System (PECS) is a specific, manualized graphic symbol-based program designed to improve early symbolic communication skills and has been used most frequently with children who have ASD (Bondy & Frost, 1994). PECS was developed within the Delaware Autistic Program (DAP) used to teach children with autism to exchange picture symbols to request items within a social context. This program was the first program to use a picture-based system with children with autism as young as 2 years of age (Bondy & Frost, 1994). Bondy and Frost suggest that most children that have been taught PECS acquire independent use of the system and many even acquire functional communication skills, whether verbal or nonverbal. It must be noted that although the acquisition of verbal speech can be viewed as a byproduct of the PECS approach, it is not its direct focus. Rather, the focus is to teach how to request items and learn to communicate (Bondy & Frost, 1994).

Bondy and Frost (1994) discuss the efficacy of teaching PECS to young children with autism as a way to communicate within social contexts. These children are taught to give a picture of a preferred item to a communicative partner in exchange for the item. This is beneficial because this system allows for the child to initiate communication for a desired outcome within a social context. Since children with autism struggle with social rewards, communication training must then have reinforcement that is functional and meaningful. Bondy and Frost (1994) documented the progress of 85 children who entered PECS training without functional speech or AAC systems over a 5-year period. These

children were 5 years or younger and over 95% learned to use two or more pictures within the exchange format detailed in six phases.

Bondy and Frost (1994) begin the first phase of PECS training by determining which items the child persistently desires. This is done by displaying an assortment of objects on a table and then simply observing which object is played with or which food or drink consumed. Once preferences are noted, the trainer removes all the items except the preferred item. The trainer then places the item in view and as the child reaches for it, the trainer places a picture of the referent into the child's hand. The trainer guides the child to release the picture into the trainer's hand and then gives the child the item. The key is to avoid using verbal prompting to initiate an exchange. By the end of this phase, the child should understand the connection of the picture and item and use it independently to request the preferred item.

The second phase as described by Bondy and Frost (1994) is focused on expanding spontaneity. The trainer is now in front or to the side of the child. The trainer gradually moves away from the child and moves the communication board farther from the child. The child will then learn to get the picture and approach the trainer to initiate the exchange. In this phase, the trainer also manipulates the surroundings so that the preferred items are available but not readily accessible. By the end of this phase, the trainer increases the distance between him or her and the child so that the child must go to his or her communication board, pick up a single picture, and walk over and give the trainer the picture to receive the requested item.

Phase three focuses on teaching the child to discriminate among two or more pictures on the board. This is done simply by adding more pictures to their board, usually

with most of the pictures being out of context with one “fitting” the context. By the time the child reaches phase four, their communication system should contain 12-20 pictures, so phase four focuses on building sentence structure. The trainers still work on requesting, so they teach the phrase “I want _____” through placing pictures on a sentence strip to form an appropriate phrase.

Phase five focuses on teaching the child to respond to verbal prompts, specifically to the question “What do you want?” through delayed prompting. The child uses the phrase “I want” and an item picture to answer the question. Phase six is then concentrated on teaching the child to comment in response to a question. Through delayed prompting, the trainer places a preferred item on the table with the picture card “I see” or “I have” and then demonstrates pointing to the phrase card and the item card. After phase six, the child should have about 30-50 items in their repertoire.

In Bondy and Frost’s (1994) report, 59% of the children who used PECS for more than 1 year acquired speech as their sole communication system. Additionally, 29% used a combination of speech and pictures to communicate. Overall, 76% of all the children paced on PECS in this study came to use speech either as their sole communication system or in combination with PECS. It should be known that PECS is an initial language training package that is helpful with young children who display a significant communication deficit.

Tien (2008) conducted a review of articles on PECS and reached similar conclusions that it is an effective intervention for improving functional communication skills for participants with ASD. Sulzer-Azaroff, Hoffman, Horton, Bondy, and Frost (2009) also reviewed data from 34 peer-reviewed studies and concluded that PECS is an

effective method of training functional communication for individuals with limited to no speech ability. Overall, there is evidence that PECS has moderate effects in improving communication skills for children with autism and may even improve speech ability for some children prior to intervention (Flippin et al., 2010).

Benefits of PECS. PECS appears to be a promising AAC system for several reasons. Of its benefits, PECS does not require prerequisite imitation skills, facial orientation, or motor skills not currently in the child's repertoire. Many of the other skills such as eye contact or verbal imitation skills are also not necessarily required. Also, because the first skill taught in PECS is requesting, it has been targeted in early instruction for those with developmental disabilities due to motivational considerations (Reichle & Sigafos, 1991). Individuals with autism are less likely to be motivated by the social consequences of labeling or commenting, than by requesting and immediately obtaining a concrete item (Bondy & Frost, 1994). Lastly, picture symbols are highly iconic making them easily recognized by the learners and are more recognizable by communicative partners than some of other systems, such as manual signs (Mirenda, 2003).

Factors that affect the use of PECS. A limitation of PECS includes the restricted range of communication skills targeted in the approach; PECS training primarily consists of requests. PECS may not be the best selection for a long-term intervention because it doesn't address question-asking, which may make it better implemented as a part of a multimodal system for when picture communication is more socially appropriate (Ostry, Wolfe, & Rusch, 2008). Also, preparation of picture symbols can be labor intensive for clinicians and the need to carry a communication book

with limited vocabulary choices can be cumbersome (Flippin et al., 2010). Sensory integration disorders might come into play for the acquisition of PECS because, depending on the severity of the sensory integration problem, pointing to pictures to communicate may not provide appropriate stimulation for those with sensory integration disorders like hypo-reactivity. Sensory processing involves taking in information through touch, movement, smell, taste, vision, and hearing. In the case of children who are hypo-reactive, a child may need to work with a professional to recognize a picture actively by jumping on it or making an exaggerated motion to register the action in their mind (Schaaf & Miller, 2005). For example, the SLP may provide the child with frequent opportunities to satisfy his need for tactile stimulation through different textured PECS boards or objects he can hold (i.e., fidget toys). In the case of hyper-reactivity, the SLP may slowly expose the child to a variety of textures and touch experiences in a non-threatening environment. These professionals can provide the child with tools and coping techniques for use within school, home, and other social environments (Schaaf & Miller, 2005). Lastly, there is a lack of controlled data regarding the generalization of PECS across settings and partners. Mirenda (2003) stated that there is weak empirical support for PECS and that further research is necessary to establish empirical efficacy. Despite systematic reviews of the literature, there has been no meta-analysis to date that has examined the effectiveness of PECS on communication and speech outcome for children with ASD (Flippin et al., 2010).

Speech-Generating Devices

Speech-generating devices (SGDs), also known as a Voice Output Communication Aids (VOCAs), are forms of AAC that display visual-graphic symbols,

or pictures, on one or more locations. When that location is activated, the device generates a speech output. The speech output can be digitized or synthesized. Digitized speech refers to recorded human voice as sampled segments of sound waves (Schlosser, 2003). Digitized speech varies in terms of sampling rate, or the number of measurements taken per second of digitization. However, the higher the sampling rate of the speech, the greater is the amount of memory necessary to encode the speech (Venkatagiri, 1996). Digitized speech is typically used in AAC devices that are used with beginning communicators, such as preschoolers who require AAC. This type of speech output has been thought to be close to or as intelligible as natural speech (Mirenda & Beukelman, 1987). Digitized speech also easily and accurately captures the intonation of speech. Another advantage of digitized speech is not only that it is the most natural-sounding which increases listener intelligibility, but individuals can access a number of predetermined messages that can be easily changed and programmed (Drager, Clark-Serpentine, Johnson, & Roeser, 2006).

The other speech output type is synthesized speech, which is computer-generated, although some synthesizers are based on the human voice. Synthesized speech has been shown to be less intelligible than natural speech, particularly at the single word level (Mirenda & Beukelman, 1987). Drager et al. (2006) investigated the intelligibility of both synthesized and digitized speech on typically developing children. When sentences were presented to the children without a topic cue, the intelligibility of digitized speech was significantly higher than the synthesized speech (Drager, Reichle, & Pinkoski, 2010). Another advantage of synthesized speech in SGDs is the text-to-speech feature. If the

user of AAC is literate, then he or she can type any message that the SGD then speaks. In this way, the ability to communicate is virtually unlimited.

Of the various AAC options, SGDs appear to offer a promising mode of alternative communication for individuals with autism and related developmental disabilities (Schlosser & Blischak, 2001). Schepis, Reid, and Behrman (1996) stated that a potential advantage of SGDs is that voice output combines an auditory voice-output with the communicative act which may increase the probability of listeners attending to the person's communicative attempts. The combination of speech output and attention-getting could make these devices suitable as means of repairing communication breakdowns.

Use of SGDs with Children with ASD

In the past, children with cognitive disabilities were frequently excluded from AAC intervention (Ronski & Sevcik, 2005). But, investigators have argued against excluding children from AAC interventions based upon intellectual performance or prerequisite sensorimotor skills (Kangas & Lloyd, 1998). Children do not need to have a certain set of skills to be able to benefit from AAC. In fact, some individuals with severe disabilities cannot demonstrate their cognitive abilities without a means to do so (e.g., an SGD). Thus, developing language skills through AAC might be critically important to aid the child in making functional cognitive gains (Ronski & Sevcik, 2005). In the absence of speech, many children with autism rely on prelinguistic communicative behaviors such as reaching, pointing, and other hand gestures to communicate (Keen, Sigafos, & Woodyatt, 2001). But, children with autism often fail to develop symbolic forms of

communication in the absence of explicit intervention and instead may develop challenging behaviors (Durand, 1999).

Additionally, students with severe communication disabilities have a high probability of encountering communication breakdowns (Houghton, Bronicki, & Guess, 1987). This may be because prelinguistic acts, unlike speech, do not always include an attention-getting component (Sigafoos et al., 2004). Breakdowns may then arise because the listener was not attending to the child at the time, did not recognize the act as an attempt to communicate, or was unable to decipher what the child was attempting to communicate (Sigafoos et al., 2004). When listeners fail to attend to these prelinguistic behaviors, children may benefit by learning to respond with an alternative form of communication, such as a SGD, to repair that breakdown.

Sevcik, Ronski, and Adamson (2004) examined the acquisition and use of graphic symbols on a SGD in one child's home and therapy sessions. They observed the language and communication behaviors of the child with severe developmental delays who had little functional speech. Sevcik et al. also collected language assessments. The child's state of engagement varied across settings and there was a clear increase in the use of symbols observed at home. His communicative attempts increased after the introduction of the SGD. Not only did the study show that the AAC was a useful technique to increase communication, but the child's parents reported on the successful use of the SGD attesting that it is a viable communication intervention approach for young children.

Factors that influence the use of SGDs. There are several limiting factors to using SGDs, such as battery life. This can be restrictive if the user does not have the time

or ability to allow the device to charge, or if he or she simply forgets to do so. Another issue concerns the physical dimensions of these displays. All SGDs require a physically defined and limited space upon which symbols are presented (Wilkinson & Hemming, 2007). This may be a limiting factor depending on the motor capabilities of the user. If a user of a SGD has limited motor abilities, small icons that need to be activated by skin contact may prove to be difficult. Adjustments such as increasing icon size and icons per page may need to be made. In addition, the weight of the device is a factor affecting accessibility if the individual has motor difficulties or if the user is a young child. Individuals using SGDs also need a considerable amount of time to sequence messages depending on the complexity of the message.

Total Communication

One method used in conjunction with ASL is called total communication (TC). TC is comprised of several communication options including manual, written, oral, and auditory. TC can involve fingerspelling, sign language, writing, lip-reading, gestures or miming, in conjunction with a verbal aspect, like voicing.

TC may be a practical treatment strategy for teaching receptive and expressive vocabulary to individuals with autism (Goldstein, 2002). In TC training, children may be taught to request items, engage in conversation, and exhibit verbal behavior under the control of various stimulus conditions. A common form of TC is simultaneous communication (also known as "sim-com") which is the use of spoken words simultaneously with a signed version of the spoken utterance. As expected, the presentation of verbal speech alone is less effective for individuals who have poor verbal imitation skills so it would appear that presenting signs, as well as verbal speech, is an

effective strategy for encouraging early vocabulary learning. Autism research literature provides some evidence that natural speech may also develop along with manual signing in the context of TC (Goldstein, 2002). In Sundberg and Partington's (1998) study comparing speech-only treatment to treatment augmented with TC, the simultaneous communication training resulted in quicker and more complete learning of vocabulary than speech training alone. Although there is a need for more research on TC intervention for children with autism, there is current evidence that simultaneous communication training in teaching signs and speech produces favorable communication outcomes for children with autism and other developmental disabilities (Sundberg & Partington, 1998).

Studies Comparing AAC in Children with ASD

There are a number of studies comparing the efficacy of a variety of AAC techniques. One is Tincani's single-subject study (2004). The participants were two elementary school-aged students with ASD and difficulty using functional speech. The study's sessions involved presentations of preferred items. Tincani aimed to determine which method, PECS or ASL, was more effective in teaching requesting of items. A stimulus preference assessment was conducted to identify which items were preferred to use during training. A list of 10-12 preferred items was made incorporating food and drinks, as well as toys. Preferred items were then randomly assigned to PECS and ASL training conditions. Participants were taught how to form hand signs to request items in ASL training, and how to as match picture symbols to food, drinks, and toys and place them into sentences using PECS training.

Tincani's (2004) results indicated that both children, who did not previously have functional speech, actually produced verbal speech as a result of intervention. This was

an unanticipated success. Further, sign language training produced a higher percentage of vocalizations during training for both participants. One participant produced a higher percentage of independent mands through sign language training, while PECS training produced a higher percentage of independent mands for the other participant. The researcher also found that the mands generalized to classroom activities. The results of this study suggest that acquisition of PECS and sign language may depend ultimately on the individual characteristics of the participants and their level of motor imitation skills prior to this study.

Richman, Wacker, and Winborn (2001) compared the use of a communication card that meant “I want toy” with a manual sign for PLEASE in a 3-year-old boy with pervasive developmental disorder (PDD). The participant was taught to use both the card and the manual sign to ask his mother for toys. Following instruction of card-use only, the participant primarily used the card to communicate his desire. Once he learned to sign PLEASE, he showed consistent preference to this method even when the card was available. Richman et al. (2001) suggested that this occurred because use of the manual sign was more efficient.

In another study comparing AAC techniques, Doss et al. (1991) compared the use of four aided AAC devices: a picture wallet with Picture Communication Symbols (PCSs), two different SGDs, and a SGD that also provided printed output. They measured the amount of time it took for participants to order food items in a fast food restaurant. The results of this study indicated that the quality of the speech output delivered via the SGDs had a positive impact on the success of requests based on the time it took to order the food and the low number of requests for clarification from the clerk. Also, it showed

that the picture wallet with PCSs was more effective than a SGD with low-quality speech.

Boesch, Wendt, Subramanian, and Hsu (2013) conducted an experimental, single-subject research study that investigated the efficacy of PECS versus a SGD in teaching requesting to three elementary-age children with severe autism who had little to no functional speech. The study's results demonstrated increases in requesting behavior for all participants across intervention phases with both AAC intervention strategies. Their findings suggest PECS and SGDs are equally appropriate for developing initial requesting skills and successful implementation of either AAC strategy is attainable with training.

Bock, Stoner, Beck, Hanley, and Prochnow (2005) also compared the use of PECS and SGDs with six preschool children with developmental delay. These children were nonverbal and had not previously used an AAC system to communicate functionally. Bock et al. specifically looked at which communication strategy resulted in a more rapid rate of acquisition of requesting skills, as well as to what extent communication behaviors utilizing these two AAC techniques generalized to the classroom setting. Baseline data were collected in the first week and a half, intervention was conducted over five and a half weeks, and generalization probes were taken one week after the intervention stage. For three of the children, use of PECS was acquired at a higher rate than the use of SGD. It was noted that the physical and positioning demands related to the SGD in Phase I of the intervention appeared to be more difficult than using PECS. Once the children mastered the motoric aspects of the tasks, they were then able to utilize the SGD to request in Phase I of intervention. While they showed an increased

performance with the SGD in Phase II, they did not meet the criterion to move to Phase III due to time constraints of the study. Two children, though, were able to acquire PECS through Phase II and even begin Phase III of PECS intervention.

Results for the children when intervention was transitioned into the classroom indicated that the change was disruptive to their learning of both modalities. Additionally, when children were allowed to choose which technique they wanted to use in the classroom, individual preferences were noted. Some chose to use PECS, others the SGD. Results from 5 of the 6 children led Bock et al. to suggest that if training for either PECS or SGD is initiated in pull-out sessions, further training should be conducted in the environments in which those specific behaviors are expected to occur and child preferences should be honored.

The results of Bock et al.'s (2005) study showed that all the children learned to request spontaneously when taught an intervention approach that applied the principles of positive reinforcement. Also, all children showed at least some evidence of maintenance of these behaviors during generalization probes. Furthermore, their study showed the importance of considering the individual child. Children should not be taught only one method to communicate since the act of communication is multimodal. A child should be provided with various means of communication so that the appropriate one can be used in specific situations.

Schlosser and Lee (2000) conducted a meta-analysis of 20 years of AAC research and integrated data from 50 studies to identify strategies that induced generalization and initial acquisition of communication techniques. They found that acquisition of unaided AAC approaches (such as manual signing) were more effective than aided approaches

(such as graphic symbols). No differences were found with regard to generalization. In general, Schlosser and Lee's (2000) results suggest that there may be an initial learning advantage for manual signs over aided techniques, although it may not result in significant generalization over time.

Evidence-Based Practice Applied to AAC

Schlosser and Raghavendra (2004) describe evidence-based AAC practice as the integration of best and current research evidence with clinical and educational expertise and relevant stakeholder perspectives for the purpose of facilitating decisions about assessment and intervention that are believed effective and efficient for a given direct stakeholder. Evidence-Based Practice (EBP) is an approach to clinical practice that puts emphasis on the importance of integrating comprehensive research evidence into the decision-making process. EPB may serve as a vehicle for translating research into practice and vice versa. Also, today's health care environment and education are increasing demands for accountability (Schlosser, 1999).

Further evaluating the definition of EBP as applied to AAC, best and current research evidence is defined as the most current data of high internal validity (Schlosser & Raghavendra, 2004). Clinical expertise is the knowledge and skills related to clinical roles determined by the ASHA (2002). Educational expertise is defined as reasoning and knowledge related to educational roles, with both clinical and educational expertise being informed by theories about aspects of AAC (Mitchell, 1999). Relevant stakeholder perspectives are the viewpoints and expectations of AAC approaches and intervention strategies of those who, either directly or indirectly, control the viability of intervention. The person who is using AAC is considered the direct stakeholder because they are the

direct recipient of all subsequent decisions arising from the EBP process (Schlosser & Raghavendra, 2004).

Some parents are hesitant to initiate AAC interventions because of concerns that AAC will inhibit speech production due to the dependence on the device to communicate instead of verbal speech (Beukelman, 1987). As discussed so far, AAC may actually facilitate natural speech for individuals with disabilities with significant speech impairments. As outlined by Millar et al. (2006), there are several reasons why AAC would help facilitate speech production. AAC intervention may reduce stress associated with the pressure to speak and therefore, produce speech in individuals with developmental disabilities (Lloyd & Kangas, 1994). AAC may also allow individuals with significant speech impairments to simply focus on communication and not on speech production or the motor demands specifically. After establishing basic communication skills, they may be in a better position to reallocate resources to improve their verbal speech productions (Ronski & Sevcik, 1996). Ronski and Sevcik (1996) also suggested that the immediacy and consistency of speech output may encourage imitation and production of natural speech. Overall, “the best evidence indicates that AAC interventions do not have a negative impact on speech production” (Millar et al., 2006, p. 257).

EBP is a process that is not complete until the experts and stakeholders publicize their experiences, either at professional conferences or in journals/ newsletters. In this way, other researchers and clinicians can benefit from attempts to implement EBP in their future practice (Schlosser & Raghavendra, 2004).

Stakeholders' Opinions and Perspectives

AAC techniques are designed to support the user's ability to connect with their community. Schlosser and Raghavendra (2003) state that stakeholders' perspectives are defined as "the viewpoints, cultural beliefs, preferences, concerns, and expectations relative to aided and unaided approaches, intervention strategies, symbols, and devices of those stakeholders that control the viability of an assessment or intervention either directly or indirectly" (p. 265). The views of indirect stakeholders, meaning family, caregivers, and friends, are of relevance because these individuals are strongly impacted by all decisions relating to AAC intervention and communication. These decisions may also impact immediate community stakeholders, meaning peers of individuals using AAC, teachers, and employers (Schlosser & Raghavendra, 2004). Important decisions such as what AAC device will be purchased, how training or therapy will be provided, and how the device is maintained involves the individual using the AAC, his or her family members, and communication and education professionals (Rackensperger, McNaughton, Krezman, Williams, & D'Silva, 2005). Parette and Angelo's (1996) research findings suggested that successful outcome in AAC device use is often attributed to the support and commitment of family members. Family stress due to the demands of the AAC device and lack of training and personal involvement; therefore, have been associated with AAC abandonment (Angelo, 2000). It is crucial to train family members to recognize and respond to the communication of their child using an AAC device (Ronski & Sevcik, 2005).

As stated above, EBP is the integration of best and current research evidence with clinical and educational expertise, as well as relevant stakeholder perspectives. This is all

in order to facilitate decisions about assessment and intervention that are deemed effective for a direct stakeholder. The perspectives of relevant stakeholders need to be considered as part of the decision-making process. According to Schlosser and Raghavendra (2004), the views of indirect stakeholders are relevant because these individuals are strongly affected by EBP-related decisions and may indirectly influence feasibility. Stakeholders may prefer to try out a particular treatment, even though the scientific evidence indicates that the treatment is invalid. Although the SLP may disagree with the stakeholder's decision, the SLP will have done the correct thing by sharing the scientific evidence with the stakeholders aiding the stakeholder to make an informed decision and thereby the SLP must respect the views and opinions of the stakeholders. When research evidence is insufficient for facilitating decisions about intervention, then the practitioner must heavily rely upon reasoning and stakeholder perspectives. Given the fact that the stakeholders are the individuals affected by all decisions regarding their use of AAC, their opinions are held most valuable (Schlosser & Raghavendra, 2004).

Conclusion

It is unlikely that any single system best meets the diverse needs of all children with autism and multiple disabilities. Experimentally controlled research studies have shown that there is no negative effect on speech from using AAC, and that its use might even result in improvements in speech for many children. Using aided AAC also might cause children to begin accessing their devices independently, which can provide them with the means to vastly expand their level of linguistic competence (Yoder & Stone, 2006). What is most important is the skill and investment of therapists and parents to train children with autism to communicate functionally.

Purpose of the Study

AAC intervention may benefit individuals with developmental disabilities who have significant speech and language impairments by providing a method to communicate. Because 25% of children diagnosed with ASD may not develop functional speech in adulthood, this is a population with whom SLPs work to develop functional communication. The purpose of this study is to utilize focus groups and individual interviews to investigate the effectiveness and efficiency of AAC techniques in facilitating language as expressed by the opinions and attitudes of stakeholders involved in the process. Specifically, what are stakeholders' perceptions of the advantages and challenges to the use of AAC with children who have autism? Furthermore, what are the similarities and differences between these perceptions of various groups of stakeholders?

The specific questions asked to the teachers and SLPs by the moderator were: (a) what is your experience with AAC?, (b) what are the greatest issues in the selection of AAC with children with ASD?, (c) what are the greatest challenges faced with AAC intervention and generalization of skills?, and (d) what support have you received throughout this process? Potential follow-up questions consisted of: (a) what processes do you use to select AAC components for children with ASD? (b) Do you use a team approach?, and (c) who are the key players on the team? Questions for parents consisted of: (a) which AAC system does your child use and why?, (b) what was the biggest issue in the selection of AAC?, (c) in your experience, what have been the largest challenges, as well as joys, regarding your child's use of AAC?, (d) did you feel like your opinions were included in the process of selecting an AAC technique for your child?, (e) what support did you receive during this process?

CHAPTER III

METHODOLOGY

Focus Groups and Interviews

The aim of the current study was to gather more information about AAC stakeholders' perspectives on the use of various AAC techniques with children with ASD who are non-verbal. To meet this aim, focus groups interviews and individual interviews were conducted as effective techniques to measure stakeholder perspectives. A focus group is "an informal discussion among selected individuals about specific topics relevant to the situation at hand" (Beck, Trombetta, & Share, 1986, p. 73). One of the characteristics that distinguish focus groups from other methods of qualitative interview procedures is the group discussion piece. The major assumption of focus groups is that a more complete understanding of the issues will be obtained due to the candid and permissive atmosphere that promotes the expression of past experience and opinions (Vaughn, Schumm, & Sinagub, 1996). The main goal of focus groups is to conduct an interactive discussion that can elicit a greater and more in-depth understanding of perceptions, beliefs, and attitudes from multiple points of view and to document the context from which those understandings were derived. Focus group interviews rely on the interactions that take place among the participants in the group to generate data. The interviewer may act as the moderator who encourages participants to generate discussion around particular topics (Vaughn et al., 1996). Furthermore, focus group interviews offer

researchers in education and psychology the opportunity to gather qualitative data regarding the perceptions and opinions of selected participants.

Focus groups are best used when conducting exploratory research and have several advantages (Merton & Kendall, 1946). These interviews may be used to explain the relationship between a stimulus and an effect. Focus group interviews can also provide information to assist in interpreting unexpected effects, such as when a group of individuals do not respond in an expected way. They are useful because they can provide verification in interpreting data that previously may have been simply inferred. Focus group interviews can provide alternative interpretations of findings that may not be obtainable using quantitative methods (Merton & Kendall, 1946). They are also helpful in the collection of different types of data; in the current study focus groups will be used to collect data concerning the range, specificity, depth, and personal context for the advantages and disadvantages of different AAC techniques experienced in the lives of AAC stakeholders. Most texts on focus group interviewing recommend that groups should consist of six to 12 participants (Hatch, 2002). The main idea is to have enough individuals to generate a discussion, but not so many that some individuals will have a difficult time participating.

Individual interviews were also conducted for this study. According to Kvale (1984), the very act of talking with another person that shares a common interest, is genuinely interested in your viewpoint, and who is not critical can be a richly rewarding experience. A frequent reason cited by participants for consenting to participate in a study is the hope that telling their story will help others (Corbin & Morse, 2003).

Informed Consent Process

This study received IRB approval to gather participants by sending out invitations. These invitations laid out the researcher's goal, benefits, risks, and privacy guidelines of taking part in the focus group or individual interviews (see Appendix A). Invitations to participate in the focus groups and individual interviews were sent to local institutions and agencies like clinics and preschools. The aim of these invitations was to recruit parents of children with ASD, as well as local teachers and SLPs with children with ASD on their caseload. The invitation contained a brief description of the focus group or interview topic and what the participants could expect to happen during the meeting.

To ensure that participants did not feel coerced into being interviewed or a part of focus groups, consent forms were distributed and written consent obtained. Consent forms indicated that individuals were free to choose whether or not they participated (see Appendix A). Furthermore, participants were given the option of withdrawing from the study at any time without penalty. The participant expectations were explained clearly before persons agreed to be interviewed or part of a focus group. Once the participants agreed, the researcher and participants negotiated the time and place to meet.

Participants

The current study utilized one 55-minute focus group interview with five members. This group consisted of SLPs who have had children with autism and who use AAC on their caseload. The SLPs focus group consisted of four Caucasian females and one Caucasian male. Each SLP had varying degrees of experience with this caseload. One SLP worked in two self-contained autism classrooms, one worked in a high school

with teenage-aged students with autism, while several of the other SLPs worked in a Midwestern speech clinic with children with autism on their caseload. The researcher also conducted four additional interviews; two with teachers whose classrooms contained children with autism who used AAC and two with parents of children with autism. Participant 6 and 9 were parents, Participant 7 and 8 were teachers. Three of the participants were Caucasian females and one was an African American female. These interviews ranged from 15- to 25-minutes in length. The teachers both had over 20 years of experience working with this population in schools. One parent was a parent of a pre-teen with autism with 14 years of experience with AAC and the other participant was a parent of an adult with autism with 16 years of experience with AAC.

Materials

Audio recording took place in the focus group and each interview session with the permission of each participant and with an understanding that each participant's identity would be protected and kept confidential. The audio recording device that was used is the Olympus VN-6200PC. Audio recording is essential for transcription purposes after each session. Refreshments were served during the focus group interview. In addition, appropriate parking was arranged for each individual participating in the discussions.

Procedure

After IRB approval was received, dates and times were established with individuals who agreed to participate based on the overall availability of the participants and moderator. Focus groups were held in a conference room within the Department of Communication Sciences and Disorders at Illinois State University. This chosen facility is conveniently located to minimize travel for the participants. Members of the group are

most likely to communicate with others who are seated across from them (Vaughn et al., 1996). The table and chair arrangements allowed all group members equal access to each other. The moderator guided the discussion which contained several key elements such as an introduction, questions, wrap-up, and closing statements. Tape recording began at the beginning of the focus group. In addition to the audio recording, the moderator and one undergraduate research assistant took notes on verbal and nonverbal messages that may have been relevant to the findings.

For the individual interviews, dates and times with individuals who agreed to participate were also established based on the overall availability of the participant and moderator. Several of the interviews were held in a conference room within the Department of Communication Sciences and Disorders at Illinois State University, while one interview was held in the teacher's office on campus at Illinois State University.

The specific questions asked to the teachers and SLPs by the moderator were: (a) what is your experience with AAC?, (b) what are the greatest issues in the selection of AAC with children with ASD?, (c) what are the greatest challenges faced with AAC intervention and generalization of skills?, and (d) what support have you received throughout this process? Potential follow-up questions consisted of: (a) what processes do you use to select AAC components for children with ASD? (b) Do you use a team approach?, and (c) who are the key players on the team? Questions for parents consisted of: (a) which AAC system does your child use and why?, (b) what was the biggest issue in the selection of AAC?, (c) in your experience, what have been the largest challenges, as well as joys, regarding your child's use of AAC?, (d) did you feel like your opinions

were included in the process of selecting an AAC technique for your child?, (e) what support did you receive during this process?

Data Analysis

The moderator and two undergraduate assistants who assisted with the study divided the transcriptions so that the focus group meeting and interviews were transcribed by two individuals independently. Although audio-taping began as soon as focus groups and interviews were initiated, transcription began when the first question was asked.

The moderator compared the two completed transcripts per meeting and calculated agreement indexes by noting all agreements and disagreements and dividing agreements by disagreements and agreements and multiplying by 100. This ensured inter-rater agreement and offered a more comprehensive base for data analysis. If any discrepancies were found, the moderator reviewed the recording to determine the correct transcription.

There are several analytical approaches that can be used for qualitative data analysis. Margin coding is described as an approach where themes are identified, and then numbers and letters are used to represent the themes (Lederman, 1990). This is the approach that was used in the current study.

Following the transcription stage, the moderator and the first reader independently reviewed each transcription and determined themes and subthemes that arose from the data pertaining to each question asked. The moderator met with the first reader to discuss these themes. The moderator then met with both of the undergraduate assistants to discuss the agreed-upon themes. The moderator and the two assistants divided the transcripts so that each one was coded independently, according to the themes, by two

individuals involved in the research. A unit-by-unit agreement index was determined for each major theme which was calculated by dividing the number of codes agreed upon by the number of agreed upon codes plus the number of disagreed upon codes and multiplying the result by 100. In this way, the arising themes pertaining to each question gathered from the focus group and each individual interview were analyzed and shown to have inter-rater agreement.

CHAPTER IV

ANALYSIS OF THE DATA

Transcription Agreement-Indexes

The moderator assessed the agreement indexes between the transcriptions of the two independent transcriptions by noting all the times that the two transcriptions agreed, dividing that by all the times they were in agreement plus disagreements, and multiply by 100. There was a 99.8% agreement index for the focus group interview, 99.8% for participant 6, 99.8% for participant 7, 99.8% for participant 8, and 99.5% for participant 9. For each disagreement found, the moderator reviewed the recording to determine the correct transcription.

Agreement Indexes for Major Themes Overall

The inter-rater agreement index scores between the moderator and an undergraduate assistant for the focus group interview and the four individual interviews (ie., participant 6, 7, 8, and 9) were: 84%, 77%, 86% 90%, and 82%, respectively. All responses that were scored differently were discussed and final data used were themes upon which both raters agreed.

The major themes that emerged from participants' responses in both the focus group and individual interviews were: training suggestions, benefits of certain AAC techniques, supports, general barriers to the use of AAC, barriers to the use of AAC specific to devices, and abandonment or switch of devices.

Agreement Indexes for Major Themes by Group

The agreement indexes for the major themes of training suggestions, benefits of certain AAC techniques, supports, general barriers to the use of AAC, barriers to the use of AAC specific to devices, and abandonment or switch of devices for SLPs were 100%, 100%, 90%, 91%, 87%, and 100%, respectively (see Table 1). The agreement index for each theme for teachers were 100%, 90%, 80%, 87%, 77%, and 100%, respectively (see Table 2). The agreement index for benefits of certain AAC techniques, supports, general barriers to the use of AAC, and barriers to the use of AAC specific to devices, for parents were 85%, 80%, 83%, and 81%, respectively (see Table 3).

Subthemes for SLPs

Subthemes for training suggestions. Two subthemes arose pertaining to training suggestions. Each SLP indicated that they had received at least some level of AAC training. For example, Participant 1 stated, “I have gotten the opportunity through my school district to go to PECS training... And I really like that.” The other theme that arose was the need for more AAC training for SLPs. Participant 4 expressed difficulty in providing AAC therapy: “You’re also teaching them to use the device, the strategies, and then socially it’s not appropriate. So you’re teaching them so many different things, that it’s, it’s very difficult to do that.” Another participant expressed that:

As far as training is concerned, AAC is such a huge area that there is no possible way to, unless you advocate for yourself, to get that knowledge – you’ll never know it all... Go to continuing ed for yourself.

The SLPs agreed that it is important that therapists gather as much information regarding AAC as possible to offer the best therapy possible to their students.

Subthemes for benefits of certain AAC techniques. SLPs expressed many benefits of certain AAC techniques. For picture communication methods, Participant 1 expressed the benefits of pictures being accessible, universal, and cheap. The participant shared:

I use the pictures the most and it's because they're the most accessible and I feel they're the most universal as far as like everyone can understand a picture... a kiddo could walk up to a stranger on the street and hand them a picture and they would understand that that has meaning. So, that's personally how I feel, it's the most, I mean it's cheap. I can print off a picture anywhere so that's what I use the most definitely.

Participants 2, 3, 4 and 5 agreed and shared similar thoughts. It was also shared that pictures can be a method used in situations when a device or other AAC can't be used.

Other opinions expressed by SLPs were in relation to device use. Participant 5 stated, "I do not feel the kids stand out holding a DynaVox. I do not feel they've been treated any different." Participant 1 agreed by saying:

The one thing I do like about the new devices now though, is that they're looking more and more like iPads, um so they look like tablets and tablets are super popular. So that kiddo that walks in with a tablet is no different than that 6- year old that's playing on his tablet or whatever.

These participants remarked on the social acceptance of devices in the current day.

Participant 5 also mentioned the convenience of devices saying, "And if the iPad breaks, they've already bought the app, they don't have to re-buy the app. They just have to replace the iPad."

Subthemes for supports. When SLPs were asked about the types of supports that they had received or needed in the AAC process, most expressed that they've received good support in the process. One participant commented saying, "I have worked with three different consultants through three of the different programs for, um, that give AAC devices- sell AAC devices. And I absolutely love all three of them... I've seen some really good success." There was also a general response of more support needed. One participant stated, "And the importance of getting the teachers and parents on board, I know that's a big thing." There was a consensus from speech pathologists that more support is needed from parents, as well as classroom teachers, in the use and generalization of AAC. Participant 4 shared:

I'm the expert on AAC because of my training and so therefore, I was able to program in the words they needed for the classroom, talk to the classroom teacher, work with the other students in the classroom, talk to the parents, so that you just need more time with them. Sixty minutes a week for a child who is non-verbal is not going to make it. We are the people that need to be teaching the teachers, and the parents, and the children- we need more time.

Subthemes for general barriers to the use of AAC. There were many responses to the general barriers to AAC. Some of these involved natural speech, lack of child motivation, time needed for intervention, and team underestimation. One participant stated their challenge with parents about their belief about natural speech by stating:

I still get this a lot at middle school level and that is a lot of times parents will say 'I really want my child to speak', they want that verbal communication. And we never say 'that's not going to happen' because we've seen kids become more

verbal when using the communication devices. And usually that's the type of, you know and some of it's just being able to foster a good communication environment.

Some of the responses were also relating to the issue of time. Participant 1 commented:

It's so hard because like I said, you have the sixty, my kids for sixty minutes, the ones that I can think of that are pretty non-verbal and it's just not enough. I wish I could push-in and do group lessons and kind of let the teachers watch me, but I have a huge caseload and I'm pulled in a million directions... So yeah, more time would just be a big, big thing for me.

Subthemes for barriers to the use of AAC specific to devices. Response themes relating to barriers to the use of AAC specific to devices that were mentioned pertained to the consistency of use, operational considerations, complexity of the device, funding, or maintenance of the device. For example, Participant 2 noted an operational concern by stating:

It's not charged so all the sudden there's no device. So making sure whatever form of communication they're using that it gets in their backpack or it's moved from one area to the next of their life and it's always with them. Because it's frustrating to have them show up to therapy and they don't have their iPad.

Participant 4 also shared:

I'd like to go back to the iPad issue with children of autism because I see that as a huge problem. They use it as a reinforcer and they don't use it as a communication aid... They can lock it, they can change it, and they can program it. How can we

as a profession make that more usable that a child understands this is my speech and this is my reward? To me, that is a huge hurdle.

Subthemes for abandonment or switch of devices. Lastly, another theme that arose was the topic of abandonment or the switch of devices. There were comments that pertained to issues causing abandonment. For example, Participant 5 noted that, “I’ve had three parents in the last year who had DynaVoxes and they quit because they weren’t cool enough. They don’t want their kids standing out.” Participant 2 shared a similar story stating:

And he’s had a really high-tech DynaVox device that was thousands of dollars and they’re abandoning it and trying to sell it now because they just want to use an iPad. The iPad’s cooler, it’s more mobile, lighter.

Subthemes for Teachers

Subthemes for training suggestions. Both participants indicated that they had received AAC training. For example, Participant 8 stated that “I’ve gone to Prentke Romich class on Minspeak. I’ve taken classes on DynaVox, you know the day in-service type things on here’s a quick thing on how DynaVox works.” There was also the topic of additional training needed for teachers and SLPs. Participant 7 stated:

I think that you can get the foundations in your master’s program or in your undergraduate and master’s program together um, and give those experiences but I really think to stay up on it, you’ve got to have that small group to work with that you’re constantly you know bouncing ideas off of each other with.

The participant also suggested, “Getting away and going to conferences and things like that are always beneficial.” Participant 8; however, disagreed and stated that, “I think I’ve

always had adequate training, I think that I've always had SLPs who have been very supportive." Participant 7 stated that for SLPs, "I'm not going to guarantee that they came out of their training program completely trained um, but I think they locally- they received the support that they needed." This participant's opinion supports the trend that more training is suggested for SLPs and that therapists need to make good use of the available resources in their community.

Subthemes for benefits of certain AAC techniques. Teachers agreed upon several benefits of certain AAC techniques. One mentioned subtheme was the "cool factor" or appeal that certain devices have to children with autism. Participant 7 stated:

Well, honestly I think an iPad can do everything that a DynaVox can do you know um, except I think it actually helps the child to fit in more and they can do other things on their iPad.

Another agreed upon benefit was the decreased behavior issues that come with an increase in communication. For example, one teacher stated:

It kind of opens up that communication world for them where they might not have had that ability before um where previously they were getting everything met by using their behavior um, they can now use a tool and access it without having the behavior and the negativity that surrounds that.

Subthemes for supports. The general trend for supports teachers received were positive. Participant 7 shared:

I've had great response in working with teachers... I've worked in multiple elementary schools then junior highs around here, um, and I think it's because there's good strong AAC support. I don't think the teachers would readily take it

on with everything else they had if they didn't have that support so um, you know we have access to an excellent practitioner locally.

Participant 8 remarked not only about the support received from the SLP, but also the need for a team approach in developing the child's communication. The teacher shared:

So, our SLP is really good about having the kids, talking with the parents, meeting with them, seeing how they're wanting to, how they're communicating at home and how can we make that better... I think it also helps when we take it in as a team perspective and not just that the SLP is the only person doing that, that we're all claiming ownership.

Subthemes for general barriers to the use of AAC. There were similarly many responses to the general barriers to AAC from teachers. Some of these consist of the belief about natural speech and resistance to AAC. One participant remarked about the belief of AAC impacting speech:

I think one of the biggest ones is people being fearful to put something place, or not putting something in place, because they are waiting for the child to talk. Um, and I am from a camp that definitely believes that AAC actually facilitates speech, particularly the way we try to introduce it and teach it to children.

Participant 8 also noted a lack of motivation and resistance to the use of certain types of AAC:

And when we started moving to dynamic screens, they didn't need to do that, you know the boards were right there. And even though the boards were very similar in set-up, they wanted to have that paper copy of the board versus having that on their computer.

Subthemes for barriers to the use of AAC specific to devices. One teacher participant commented on the operational barriers to devices. Participant 8 remarked, “I think parents really have not liked the DynaVoxes because of their size... It’s a big thing; you’re essentially carrying around a computer.”

Subthemes for abandonment or switch of devices. One subtheme that arose from the teacher interviews were reasons causing abandonment of devices. Participant 7 shared an experience:

It’s like they took his voice away, so that’s one situation. I was just shocked to see a thousand-dollar piece of equipment in the bottom of the closet- not charged, you know, and then to find out that he definitely knew how to use it and definitely used it at school.

Participant 8 expressed the concern of parents affecting the success of a device.

“Definitely when parents don’t buy into it. Or when they say “well, he can do that at school but we’ll do this at home”. That hurts us a lot. Because then the child only sees that they only have to communicate part of the time. I think AAC devices only work really well when the kids understand the act of needing the communication partner.”

Another subtheme was reasons preventing the abandonment or switch of device. One participant remarked:

Sixty to seventy percent of the time having verbal output on a communication device has been helpful to some of the kids, that that’s been more motivating so they’re wanting to use it more. So I definitely see that output, that type of verbal output on the device, has been a very big thing for the kids.

Subthemes for Parents

Subthemes for benefits of certain AAC techniques. The participants shared several benefits they saw in their child's life with the use of AAC in relation to uniqueness, convenience, and accessibility. Participant 6 felt that "DynaVox has a lot of unique features that are not available on other devices." This participant also said, "The iPad is really much more portable and is easier to replace." Participant 9 shared, "What was great about the ProLoQuo? It's because at first, he loved the new technology, he loves the iPad and wanted an iPhone and that's how he really got into the ProLoQuo app." The participant also shared, "That was the door that opened from the DynaVox to the iPad, not to mention everybody else was carrying their cellphones around and he wanted to do the same." It is noted that having a device can be appealing and motivating to children to use to communicate.

Subthemes for supports. One parent shared her positive experience with SLPs and support in the AAC process. The participant stated, "They've always been supportive. Even when the DynaVox broke down, we've had some really good speech therapists that would come and evaluate my son just to see if this device is- what works best for him." There was also a general response of more support in needed in the school. Participant 6 said, "I mean we've got a great one now but I don't I just don't think 20 minutes a week is enough. I mean, they need to hire tons of them."

Subthemes for general barriers to the use of AAC. Parents had several responses regarding general barriers to AAC. Some of these consist of the belief about child resistance to AAC technique and time needed for intervention. One participant said:

So PECS um – were okay for as long as they were concrete. He could use the sentence strip, he could make complete sentences but if it was not the right picture, the exact right picture for things, the, um, he kinda turned away from it. A participant also noted, “But he only has speech once a week for 20 minutes or something so I don’t know.”

Subthemes for barriers to the use of AAC specific to devices. Parents shared thoughts resulting in subthemes pertaining to operational considerations, complexity of the device, funding, and maintenance of the device. Participant 6 shared an operational concern saying:

Because that’s one of the drawbacks with um the ProLoQuo2Go. Um, you really can only do one thing at a time with that... And so they, there’s not that flexibility with- the um, and that could be part of his, could be part of his decline, too. Is he’s locked to just the ProLoQuo2Go and then they’re wanting him to do math and he can’t say, he no longer has the ability to say ‘I need help’ or whatever.

Participant 9 shared:

Because he was able to program the DynaVox better than the ProLoQuo. We had to lock him out of the programming the DynaVox, because he would just put what he wanted into there. You know, he didn’t care what you were getting him, trying to get across, he wanted to have what he wanted in there. So we had to actually lock the DynaVox so he can stop programming it.

A participant noted a funding consideration by stating:

So, with the DynaVox, it’s very expensive, and insurance... we ended up purchasing it, but it was very, very expensive. So to go to the iPod from the

DynaVox, we could buy a hundred, a thousand, before we reach the price that we paid for that DynaVox.

Lastly, a participant shared a maintenance concern about the DynaVox, “Then we would be without it for a couple weeks while it had to be shipped back and repaired.”

Generalization of skills is difficult to achieve if the child is without the device due to damage.

CHAPTER V

SUMMARY & CONCLUSIONS

Summary of the Study

The purpose of this study was to utilize focus groups and interviews to investigate the effectiveness and efficiency of AAC techniques in facilitating language in children with autism as expressed by the opinions and attitudes of stakeholders involved in the process. Specifically, what are stakeholders' perceptions of the advantages and challenges to the use of AAC with children who have autism? Furthermore, what are the similarities and differences between these perceptions of various groups of stakeholders? There have been numerous studies conducted comparing different types of AAC intervention systems, but there is little information on stakeholders' opinions. This study consisted of one focus group of speech-language pathologists who work with children with ASD, as well as four individual interviews. Two interviews were with teachers and two interviews were with parents of children with autism who use AAC. The participants were asked a variety of questions, such as: what are the greatest challenges faced with AAC intervention and generalization of skills?, what was the biggest issue in the selection of AAC?, and in your experience, what have been the largest challenges, as well as successes, regarding your child's use of AAC?

Summary of the Findings

Several trends were found in this study. One trend that arose indicated that participants agreed there was a decrease in behavior problems with an increase in

communication due to the use of AAC. Keen (2003) discussed that individuals with ASD may exhibit aggressive behaviors including biting, kicking, and hitting due to the limited ability to communicate. This fact makes it vital for SLPs and teachers to provide alternative methods of communication to decrease these instances of communication breakdowns. In order for these professionals to be efficient at offering these supports, both SLPs and teachers agreed that there was a clear need for more AAC training. The literature for children who use AAC in the classroom has similarly mentioned the need for more training in AAC and the operation of AAC systems (Finke et al., 2009; Hunt et al., 2002). Hunt's (2002) participants reported the need for adequate training of both the technical skills required to operate and maintain an AAC system and the strategies necessary to enable students to use AAC as a tool for accessing a curriculum and participating in social situations. These findings are consistent with recommendations on best practices for collaborative teaming in inclusive classrooms (Giangreco, 2000).

Collaborative teaming has been defined as a group of individuals with diverse expertise working together to achieve mutually defined goals (Snell & Janney, 2000). In the current study, the participants referred to the collaboration of SLPs, teachers, and parents. This emphasis on the team approach in supporting the child's communication needs was a major trend. SLPs shared the great need for both teachers and parents to adhere to the goal of increased communication via AAC to ensure generalization. They shared the sentiment of occasionally not being supported by parents and teachers. Collaborative teamwork is well established as one of the most critical components of quality inclusive schooling (Giangreco, 2000).

Another trend was the persistence in the belief of natural speech. SLPs and teachers shared negative experiences with parents who did not want to use AAC due to their belief that AAC interfered with natural speech. Conversely, one parent also shared how the school district was not supportive of her son receiving AAC due to the belief of AAC impacting the development of verbal speech. Millar, Light, and Schlosser (2006) reported that AAC is an effective strategy for decreasing challenging behavior without limiting the development of speech in individuals with ASD and related disorders. AAC interventions can benefit individuals with developmental disabilities who have significant speech impairments not only by enhancing their communicative competence (Light, Binger, Agate, & Ramsay, 1999), but by also facilitating the development of language (Ronski & Sevcik, 1996). Therefore, it is the responsibility of professionals such as SLPs and teachers to educate parents of children who use AAC with such research-based evidence. Additionally, SLPs and teachers must be current with the evidence base for AAC interventions and honor parents' input.

Limitations of this Study and Future Directions

A limitation in this study was the lack of participants willing to share their experiences with the moderator in both focus group and individual interview settings. The researcher's goal was to perform at least three focus groups. The achieved sample size was only half of that proposed. Future research should focus on gathering more participants through the consideration of several different methods to gather qualitative data. Future research should also explore the perspectives of other stakeholders, including students with ASD who use AAC.

Conclusion

The current study utilized focus group and individual interviews to explore the experiences of five SLPs, two teachers, and two parents who had experience with children with ASD who used AAC. This unique group of stakeholders offered multi-faceted perspectives to aid in assessing the communication needs of children with autism who use AAC. The main themes present in this study were training suggestions, benefits of certain AAC techniques, supports, general barriers to the use of AAC, barriers to the use of AAC specific to devices, and abandonment or switch of devices.

The views of stakeholders, such as family, caregivers, and friends, are of importance because they are a major component of the EBP approach (Schlosser & Raghavendra, 2004). It is vital that SLPs work in a collaborative manner with teachers and parents of children who require AAC in order to offer the best treatment possible. As the participants in this study observed, adequate SLP training is important in order to promote knowledge-base and operational use of AAC systems. Being knowledgeable about AAC ensures that SLPs are educated on both the benefits and barriers of certain AAC methods and can tailor the method to the individual needs of the child. Failing to do this effectively can result in abandonment of AAC system and communication failure for the child. Since the goal of SLPs is to improve the communication abilities of individuals with communication problems, the results of this study should be taken into careful consideration. Many factors come into play to ensure that students receive an appropriate and beneficial experience improving communication, and it is of utmost importance that SLPs receive adequate training to perform AAC responsibilities and efficiently collaborate with other disciplines and stakeholders in the child's life. In this way, SLPs

can utilize EBP when offering treatment to enhance the communication ability to children with autism.

Table 1

Major themes with greater than 20% response rate arising from SLP responses; 5 total

Training	
Participant training	80% (n=4)
Training suggestions for discipline	60% (n=3)
Benefits of certain AAC techniques	
“Cool factor”	60% (n=3)
Decrease of negative behavior	40% (n=2)
Support	
Support received from parents, teachers	80% (n=4)
Support needed from parents, teachers	60% (n=3)
General barriers to the use of AAC	
Belief about natural speech	60% (n=3)
Lack of child motivation	40% (n=2)
Time needed for intervention	60% (n=3)
Barriers to the use of AAC specific to devices	
Consistency of use	80% (n=4)
Operational considerations	80% (n=4)
Complexity of device	80% (n=4)
Funding	60% (n=3)
Maintenance	60% (n=3)
Abandonment	
Factors contributing	80% (n=4)

Table 2

Major themes with greater than 20% response rate arising from teacher responses; 2 total

Training	
Participant training	100% (n=2)
Training suggestions for discipline	100% (n=2)
Benefits of certain AAC techniques	
“Cool factor”	100% (n=2)
Decrease of negative behavior	100% (n=2)
Support	
Support received from parents, teachers	100% (n=2)
Support needed from parents, teachers	50% (n=1)
General barriers to the use of AAC	
Belief about natural speech	100% (n=2)
Lack of child motivation	50% (n=1)
Time needed for intervention	50% (n=1)
Barriers to the use of AAC specific to devices	
Consistency of use	100% (n=2)
Operational considerations	50% (n=1)
Complexity of device	50% (n=1)
Funding	50% (n=1)
Abandonment	
Factors contributing	100% (n=2)
Preventing	50% (n=1)

Table 3

Major themes with greater than 20% response rate arising from parent responses; 2 total

Benefits of certain AAC techniques	
“Cool factor”	50% (n=1)
Decrease of negative behavior	50% (n=1)
Support	
Support received from parents, teachers	100% (n=2)
Support needed from parents, teachers	50% (n=1)
General barriers to the use of AAC	
Belief about natural speech	50% (n=1)
Lack of child motivation	100% (n=2)
Time needed for intervention	50% (n=1)
Barriers to the use of AAC specific to devices	
Consistency of use	50% (n=1)
Operational considerations	100% (n=2)
Funding	100% (n=2)
Maintenance	100% (n=2)
Abandonment	
Factors contributing	100% (n=2)

REFERENCES

- Acredolo, L. P., & Goodwyn, S. W. (1990). Sign language in babies: The significance of symbolic gesturing for understanding language development. *Annals of Child Development, 7*, 1-42.
- American Psychiatric Association. (2000). Pervasive developmental disorders. In Diagnostic and statistical manual of mental disorders (Fourth edition---text revision (DSM-IV- TR). Washington, DC: American Psychiatric Association.
- American Speech-Language-Hearing Association. (1989). Competencies for speech-language pathologists, providing services in augmentative communication. *ASHA, 31*, 107-110.
- American Speech-Language-Hearing Association. (2002). Augmentative and alternative communication: Knowledge and skills for service delivery. *ASHA Leader, 7*, 97 – 106.
- American Speech-Language-Hearing Association. (2004). Roles and responsibilities of speech-language pathologists with respect to augmentative and alternative communication: Technical report. *ASHA Supplement 24*, in press.
- Angelo, D. H. (2000). Impact of augmentative and alternative communication devices on families. *AAC Augmentative and Alternative Communication, 16*(1), 37-47.
- Autism Society of America. (n.d.). Education. Retrieved December 18, 2013, from <http://www.autism-society.org>.
- Baio, J. (2012). Prevalence of autism spectrum disorders—autism and developmental disabilities monitoring network. *Centers for Disease Control and Prevention Surveillance Summaries, 61*(3), 1–19.
- Beck, L.C., Trombetta, W. L., & Share, S. (1986). Using focus group sessions before decisions are made. *North Carolina Medical Journal, 47*(2), 73-74.
- Beukelman, D. (1987). When you have a hammer, everything looks like a nail. *Augmentative and Alternative Communication, 3*, 94–95.
- Beukelman, D., & Mirenda, P. (1998). *Augmentative and alternative communication: Management of severe communication disorders in children and adults* (2nd ed.). Baltimore: Paul H. Brookes.
- Beukelman, D., Yorkston, K., Garrett, K. (2007). An introduction to AAC services for adults with chronic medical conditions. *Augmentative Communication Strategies for Adults with Acute or Chronic Medical Conditions*. Baltimore, MD: Paul H. Brookes; 2007:1-15.
- Bock, S. J., Stoner, J. B., Beck, A. R., Hanley, L., & Prochnow, J. (2005). Increasing functional communication in non-speaking preschool children: Comparison of PECS and VOCA. *Education and Training in Developmental Disabilities, 40*(3), 264.
- Boesch, M. C., Wendt, O., Subramanian, A., & Hsu, N. (2013). Comparative Efficacy of the Picture Exchange Communication System (PECS) versus a Speech-

- Generating Device: Effects on Requesting Skills. *Research in Autism Spectrum Disorders*, 7(3), 480-493.
- Bondy, A.S., & Frost, L.A. (1994). The picture exchange communication system. *Focus on Autistic Behavior*, 9, 1–19.
- Brady, N. C., McLean, J. E., McLean, L. K., & Johnston, S. (1995). Initiation and repair of intentional communication acts by adults with severe to profound cognitive disabilities. *Journal of Speech and Hearing Research*, 38, 1334-1348.
- Carbone, V. J., Sweeney-Kerwin, E. J., Attanasio, V., & Kasper, T. (2010). Increasing the vocal responses of children with autism and developmental disabilities Using manual sign mand training and prompt delay. *Journal of Applied Behavior Analysis*, 43(4), 705-709.
- Chawarska, K., Klin, A., Paul, R., & Volkmar, F. (2007). Autism spectrum disorder in the second year: Stability and change in syndrome expression. *Journal of Child Psychology and Psychiatry*, 48(2), 128-138.
- Corbin, J., & Morse, J. M. (2003). The unstructured interactive interview: Issues of reciprocity and risks when dealing with sensitive topics. *Qualitative inquiry*, 9(3), 335-354.
- Drager, K. D. R., Clark-Serpentine, E. A., Johnson, K. E., & Roeser, J. L. (2006). Accuracy of repetition of digitized and synthesized speech for young children in background noise. *American Journal of Speech-Language Pathology*, 15, 155–164
- Drager, K. R., Reichle, J., & Pinkoski, C. (2010). Synthesized Speech Output and Children: A Scoping Review. *American Journal of Speech-Language Pathology*, 19(3), 259-273.
- Doss, S., Locke, P., Johnston, S., Reichle, J., Sigafos, J., Charpentier, P. (1991). Initial comparison of the efficiency of a variety of AAC systems for ordering meals in fast food restaurants. *Augmentative and Alternative Communication*, 7, 256–265.
- Durand, M. (1999). Functional communication training using assistive devices: Recruiting natural communities of reinforcement. *Journal of Applied Behavior Analysis*, 32, 246-267.
- Filipek, P.A., Accardo, P.J., & Baranek, G.T. (1999). The screening and diagnosis of autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, 29(6), 439-484.
- Finke, E. H., Finke, E. H., McNaughton, D. B., & Drager, K. D. (2009). “All children can and should have the opportunity to learn”: General education teachers' perspectives on including children with autism spectrum disorder who require AAC. *Augmentative and Alternative Communication*, 25(2), 110-122.
- Flippin, M., Reszka, S., Watson, L.R. (2010). Effectiveness of the picture exchange communication system (PECS) on communication and speech for children with autism spectrum disorders: A meta-analysis. *American Journal of Speech-Language Pathology*, 19(2), 178–195.
- Giangreco, M. (2000). Related services research for students with low-incidence disabilities: Implications for speech-language pathologists in inclusive classrooms. *Language, Speech, and Hearing Services in the Schools*, 31, 230–239
- Goldstein, H. (2002). Communication intervention for children with autism: A review of

- treatment efficacy. *Journal of Autism and Developmental Disorders*, 32(5), 373-396.
- Goodwyn, S. W., Acredolo, L. P., & Brown, C. A. (2000). Impact of symbolic gesturing on early language development. *Journal of Nonverbal behavior*, 24(2), 81-103.
- Hatch, J. A. (2002). *Doing qualitative research in education settings*. SUNY Press.
- Houghton, J., Bronicki, G., & Guess, D. (1987). Opportunities to express preferences and make choices among students with severe disabilities in classroom settings. *Journal of the Association for Persons with Severe Handicaps*, 12, 18-27.
- Hunt, P., Soto, G., Maier, J., Müller, E., & Goetz, L. (2002). Collaborative teaming to support students with augmentative and alternative communication needs in general education classrooms. *AAC: Augmentative & Alternative Communication*, 18(1), 20-35.
- Kangas, K., & Lloyd, L. (1988). Early cognitive skills prerequisites to augmentative and alternative communication use: What are we waiting for? *Augmentative and Alternative Communication*, 4, 211-221.
- Kee, S., Casey, L., Cea, C. R., Bicard, D. F., & Bicard, S. E. (2012). Increasing communication skills: A case study of a man with autism spectrum disorder and vision loss. *Journal of Visual Impairment & Blindness*, 106(2), 120-125.
- Keen, D. (2003). Communicative repair strategies and problem behaviors of children with autism. *International Journal of Disability, Development and Education*, 50, 53-62.
- Keen, D., Sigafos, J., & Woodyatt, G. (2001). Replacing prelinguistic behaviors with functional communication. *Journal of Autism and Developmental Disorders*, 31, 385-398.
- Kent, R. D. (2004). *The MIT Encyclopedia of Communication Disorders*. Cambridge, MA: MIT. Print.
- Kvale, S. (1984). The qualitative research interview. *Journal of Phenomenological Psychology*, 14, 171-196.
- Lederman, L. C. (1990). Accessing educational effectiveness: The focus group interview as a technique for data collection. *Communication Education*, 38(2), 117-127.
- Light, J., Binger, C., Agate, T., & Ramsay, K. (1999). Teaching partner-focused questions to individuals who use augmentative and alternative communication to enhance their communicative competence. *Journal of Speech and Hearing Research*, 42, 241-255.
- Lloyd, L. L., & Kangas, K. (1994). Augmentative and alternative communication. In G. H. Shames, E. H. Wiig, & W. A. Secord (Eds.), *Human communication disorders* (4th ed., pp. 606-657). New York: Merrill/Macmillan.
- McNeill, D. (1998). Speech and gesture integration. *New Directions for Child and Adolescent Development*, 79, 11-27.
- Merton, R. L., & Kendall, P. L. (1946). The focused interview. *American Journal of Sociology*, 51, 541-557.
- Millar, D.C., Light, J.C., & Schlosser, R.W. (2006). The impact of augmentative and alternative communication intervention on the speech production of individuals with developmental disabilities: A research review. *Journal of Speech, Language, and Hearing Research*, 49, 248-264.
- Miller, L., & Lane, S. (2000). Toward a consensus in terminology in sensory integration

- theory and practice: part 1: Taxonomy of neurophysiological processes. *Sensory Integration Special Interest Section Quarterly*, 23(2), 1-4.
- Mitchell, G. J. (1999). Evidence-based practice: Critique and alternative view. *Nursing Science Quarterly*, 12, 30 – 35.
- Mirenda, P. (2003). Toward functional augmentative and alternative communication for students with autism: Manual signs, graphic symbols, and voice output communication aids. *Language, Speech, and Hearing Services in Schools*, 34, 203-216.
- Mirenda, P. & Beukelman, D. R. (1987). A comparison of speech synthesis intelligibility with listeners from three age groups. *Augmentative and Alternative Communication*, 3, 120-128.
- National Research Council. (2001). *Educating children with autism*. Washington, DC: National Academy Press.
- Ostryn, C., Wolfe, P. S., & Rusch, F. R. (2008). A review and analysis of the picture exchange communication system (PECS) for individuals with autism spectrum disorders using a paradigm of communication competence. *Research and Practice for Persons with Severe Disabilities*, 33, 13-24.
- Owens, R. (1996). *Language development: An introduction*. Needham Heights, MA: Allyn & Bacon.
- Parette, H. P., & Angelo, D. H. (1996). Augmentative and alternative communication impacts on families: Trends and future directions. *The Journal of Special Education*, 30(1), 77-98.
- Rackensperger, T., McNaughton, D., Krezman, C., Williams, M., & D'Silva, K. (2005) "When I first got I wanted to throw it over a cliff": The challenges and benefits of learning technology as described by individuals who use AAC. *Augmentative and Alternative Communication*, 21, 165-186.
- Reichle, J., & Sigafos, J. (1991). Establishing an initial repertoire of requesting. In J. Reichle, J. York, & J. Sigafos (Eds.), *Implementing augmentative and alternative communication: Strategies for learners with severe disabilities* (pp. 89–114). Baltimore: Paul H. Brookes.
- Richman, D., Wacker, D., & Winborn, L. (2001). Response efficiency during functional communication training: Effects of effort on response allocation. *Journal of Applied Behavior Analysis*, 34, 73–76.
- Romski, M. A., & Sevcik, R. A. (1996). *Breaking the speech barrier: Language development through augmented means*. Baltimore: Paul H. Brookes.
- Romski, M., & Sevcik, R. A. (2005). Augmentative communication and early intervention: Myths and realities. *Infants and Young Children*, 18, 174–185.
- Schaaf, R.C., & Miller, L.J. (2005). Occupational therapy using a sensory integrative approach for children with developmental disabilities. *Mentally Retarded Developmental Disability Resource*, 11(2). 143-148.
- Schepis, M. M., Reid, D. H., & Behrmann, M. M. (1996). Acquisition and functional use of voice output communication by persons with profound multiple disabilities. *Behavior Modification*, 20, 451–468.
- Schlosser, R. W. (1999). Comparative efficacy of interventions in augmentative and alternative communication. *Augmentative and Alternative Communication*, 15, 56-68.

- Schlosser, R. W. (2003). Roles of speech output in augmentative and alternative communication: Narrative review. *Augmentative and Alternative Communication, 19*, 5–27.
- Schlosser, R.W., & Blischak, D. (2001). Is there a role for speech output in interventions for persons with autism? A review. *Focus on Autism and Other Developmental Disabilities, 16*, 170–178.
- Schlosser, R.W., & Lee, D. (2000). Promoting generalization and maintenance in augmentative and alternative communication: A meta-analysis of 20 years of effectiveness research. *Augmentative and Alternative Communication, 16*, 208–226.
- Schlosser, R.W., & Raghavendra, P. (2003). Towards evidence-based practice in AAC. *The Efficacy of Augmentative and Alternative Communication* (pp. 259-293). San Diego: Academic Press.
- Schlosser, R.W., & Raghavendra, P. (2004). Evidence-based practice in augmentative and alternative communication. *Augmentative and Alternative Communication, 20*, 1-21.
- Sevcik, R.A., Romski, M. A., Adamson, L. B. (2004). Research directions in augmentative and alternative communication for preschool children. *Disability and Rehabilitation, 26*, 1323-1329.
- Sigafoos, J., Drasgow, E., Halle, J., O'Reilly, M., Seely-York, S., Edrisinha, C., & Andrews, A. (2004). Teaching VOCA use as a communicative repair strategy. *Journal of Autism and Developmental Disorders, 24*, 411-422.
- Snell, M. E., & Janney, R. (2000). Teachers' guides to inclusive practices. Collaborative teaming. Baltimore: Paul H. Brookes.
- Sulzer-Azaroff, B., Hoffman, A., Horton, C., Bondy, A., & Frost, L. (2009). The picture exchange system (PECS): What do the data say? *Focus on Autism and Other Developmental Disabilities, 24*, 89-103.
- Sundberg, M. L., & Partington, J. W. (1998). Teaching language to children with autism or other developmental disabilities. Danville, CA: *Behavior Analysts*.
- Tien, K.C. (2008). Effectiveness of the picture exchange communication system as a functional communication intervention for individuals with autism spectrum disorders: A practice- based research synthesis. *Education and Training in Developmental Disabilities, 43*, 67- 76.
- Tincani, M. (2004). Comparing the Picture Exchange Communication System and sign language training for children with autism. *Focus On Autism and Other Developmental Disabilities, 19*(3), 152-163.
- Vaughn, S., Schumm, J. S., & Sinagub, J. M. (1996). *Focus group interviews in education and psychology*. Sage.
- Venkatagiri, H. S. (1996). The quality of digitized and synthesized speech: What clinicians should know. *American Journal of Speech-Language Pathology, 5*(4), 31-42.
- Volkmar, F.R., Lord, C., Bailey, A., Schultz, R.T., Klin, A., 2004. Autism and pervasive developmental disorders. *Journal of Child Psychology and Psychiatry, 45*, 135–170.
- Wilkinson, K., & Henning, S. (2007). The state of research and practice in augmentative and alternative communication for children with developmental/intellectual

disabilities. *Mental Retardation and Developmental Disabilities Research Reviews*, 13, 58-69.

Yoder, P., & Stone W., (2006). A randomized comparison of the effect of two prelinguistic communication interventions on the acquisition of spoken communication disabilities: A research review. *Journal of Speech, Language, and Hearing Research*, 49, 698-711.

APPENDIX A
WRITTEN PARENTAL CONSENT FORMS
AND VERBAL ASSENT SCRIPTS

PARTICIPATION CONSENT FORM:

What is the Research?

You have been asked to take part in a research study about your experience with assistive communication techniques used with children with autism. The purpose of this study is to learn from important stakeholders what they believe to be the effectiveness of Augmentative and Alternative Communication (AAC) techniques in children with autism.

Voluntary Participation

The duration of this interview should last between 30-45 minutes. This discussion is *voluntary*—you do not have to take part if you do not want to. If any questions make you feel uncomfortable, you do not have to answer them. You may leave the group at any time for any reason. Refusal to participate involves no penalty or loss of benefits.

Risks

We do not think any risks are involved in taking part in this study other than a breach of confidentiality, that another participant might disclose who was present at the focus group and what has been discussed to others outside of the focus group, and that you might feel uncomfortable answering some of the questions. To minimize these risks, all participants will be asked to keep who was present and what was discussed confidential. They will also be asked to refrain from using names, and, if a name is used, it will not be transcribed. Instead, participants will be identified as participant 1, participant 2, and so on. Additionally, you will not be asked to answer any questions that cause you discomfort.

Benefits

There are no direct benefits to you for taking part in this research. We hope to learn more about how AAC techniques have aided children with autism. This information may be of benefit to children with autism and to their family and professions who work with them.

Privacy

Your privacy will be protected. No names will be used in any report that might be published or disseminated. All participants will be asked to not use names or to discuss specific children with autism by name. They will furthermore be asked to keep who was present and the content of the discussion confidential.

Regulators, sponsors or Institutional Review Board Members that oversee research may see research records to make sure that the researchers have followed regulatory requirements.

Audiotape Permission

An audio recorder will be used to allow accurate recording of what participants have shared. Audio files will be uploaded to the protected Communication Sciences and Disorders (CSD) Department shared drive. A folder will be made on the CSD shared drive under the chair pf the department, who is also a researcher on this study, where audio files will be uploaded. When the data have been collected, the chair will ask the College of Arts and Sciences IT department to set up a folder specifically for this data and permission will be given to those directly involved in this research. Once the audio files are uploaded to the folder, they will immediately be erased from the digital recorder. Audio files on the protected folder will be erased 5 years after the study is completed.

Data from the audio files will be transcribed and stored on a password-protected computer. All data will be analyzed by the researchers to find themes in the responses. I understand that audio taping of this session is a necessary part of this research. If I do not agree to be audio-taped, I will leave this session before the taping begins.

I agree to be audio taped Yes No

Questions

I have been given the opportunity to ask any questions I wish regarding this evaluation. If I have any additional questions about the evaluation, I may call Dr. Ann Beck at (309) 438-8643 or email at arbeck@ilstu.edu.

For additional questions about research participants' rights and/or research-related injury or adverse effects, you may contact the Research Ethics & Compliance Office at (309) 438-2529 and/or rec@ilstu.edu.

PRINTED NAME

_____ Yes, I would like to take part in the focus group or interview.

_____ No, I would not like to participate in the focus group or interview.

SIGNATURE DATE

Verbal Assent Script

I am Daria Constantinescu, a graduate student in Speech-Language Pathology, and I thank you for taking your time to attend this Focus Group (or interview) which will help me to complete my thesis project.

Let's go around the table and introduce ourselves by giving our first names only.

Please help yourselves to refreshments.

During this session, I will ask you a number of questions regarding your experience with and perceptions of the use of AAC with children with ASD. Through your responses, I hope to learn more about how to improve services to these children.

I will need to audio record this session so that I have an accurate record of your responses. If you do not agree to be audio-taped, you may leave the session at this time. For those of you who agree to be audio-tape, I ask you to try to refrain from using each other's names or the names of specific children with ASD during this session. If you should inadvertently use a name, I will delete it from the transcription of the session and replace it with a general term such as participant 1, or child 1. Also, please hold all responses and who spoke them as confidential information.

I am going to pass out consent forms now that explain this project in more detail. Please read them and sign them if you agree to participate and to be audio-taped.