"I HAVE SOMETHING TO TELL YOU," THE AUGMENTATIVE AND ALERTNATIVE COMMUNICATION PROJECT

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The Augmentative and Alternative Communication Project

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Abstract

A social-learning group was used to train caregivers of school-age augmentative and alternative communication (AAC) users. Training was aimed at the caregiver of emergent AAC users and occurred in the home and community settings using a modeling strategy. Instruction was primarily delivered in three 15-minute training sessions using Facebook. In addition to social media instruction, the caregiver-child teams met with other participants to practice and implement newly learned skills during community activities. Meetings were approximately 1-hour in length and included coaching and feedback. A single subject AB design was used to evaluate the effects of community instruction on caregiver AAC modeling. Frequency of caregiver modeling is the dependent variable measured by direct observation. Module development utilized behavior skills training techniques consisting of (a) instruction (b) modeling (c) practice (d) feedback and coaching in the community setting.

Keywords: Developmental Disabilities, Autism, Augmentative and Alternative Communication (AAC), nursing, modeling, aided-language stimulation, behavioral skills training, single subject design, community, communication partner

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Chapter 1

Introduction

Autism is a developmental disability (DD) that affects 1 in every 58 children (Baio, et al., 2018). There is no cure for autism. Children living with autism spectrum disorder (ASD) are the most common group of individuals with communication challenges. This social-communication disorder leaves 25-40% of children affected in need of augmentative alternative communication (AAC). AAC describes methods of communication used to supplement or replace oral communication for individuals who cannot speak or have difficulty speaking. It can take the form of pictures, gestures, sign language or robust technologies such as iPad applications.

Since communication and social-emotional deficits are the defining characteristics of ASD, any intervention that mitigates these difficulties becomes a critical priority (Prizant, Wetherby, Rubin, & Laurent, 2003). While ASD is the most common DD it is not the only disability resulting in communication. One in six children in the United States are diagnosed with a developmental disability (Boyle et al., 2011). Cerebral palsy (CP) is a disorder that affects an individual's ability to control muscle movement including the muscles used to speak clearly. The prevalence of CP is one out of 323 children. Recent studies have shown the occurrence of ASD among children with CP is 6.9% (Christensen et al., 2014). A co-morbidity of ASD and Down syndrome (DS) has also been identified with a higher prevalence of 37%. While the prevalence of DS and ASD co-occurrence is higher, the prevalence of DS occurs less with one in every 691 births affected (Barbosa, et al., 2018; Davis, Spriggs, Rodgers, & Campbell, 2018). Every individual with a DD exhibits uniquely different qualities. However, the speech, communication, and social deficits are a common thread regardless of ASD co-morbidity.

Background and Significance of the Problem

Research has shown that the economic and emotional burden of life-long care for children living with autism is significantly higher than any other disability. Specialized services such as education, language and occupational therapy contribute to a $2.4 million lifetime cost to support a child living with autism. In addition are costs such as loss of parental productivity, caregiver burden, medical and residential care continue through the lifespan (Buesher et al., 2014). Medicaid spends six times more money per year to provide medical care for those with ASD. This figure does not include behavioral services which can add approximately an additional cost of $40,000 per year (Long, 2018). Due to speech and language impairments, most children living with developmental disabilities will require daily, life-long care from family members who make large investments of time, money, and energy to provide such care. Ultimately, parents just want their child to have a happy and meaningful life (McNaughton, et al., 2008).

The Report of the Surgeon General (1999) states applied behavioral analysis (ABA) is an effective method for increasing functional communication and learning through motivating interventions. The most common, and most qualified, professional to initially assist with language impairments and initiation of appropriate augmentative and alternative communication is a speech-language pathologist (SLP).

Children with complex communication needs (CCN) frequently use speech generation devices (SGD) and other tools known as augmentative alternative communication. While technology has provided extraordinary benefits in helping children communicate, providing a child with technology alone will not give children the skills required to have functional communication or meaningful relationships with others (Cockerill, et al., 2014; Light, &

McNaughton, 2014). Learning to use AAC requires a multidisciplinary team working together to reach common goals.

Typical children learn language through hearing it in everyday life. For most children, language develops naturally through experience. It is estimated that typically developing children hear 125,000 words per week; while children with complex communication needs who use AAC experience approximately 1600 words per week. In a literature review by Sennott, Light, and McNaughton (2016) modeling was deemed the best methodology and the cornerstone to AAC intervention.

Despite the limited amount of exposure to language that children with CCN experience, modeling has proved extremely effective in teaching communication pragmatics, grammar and language. Although the efficacy of modeling communication to AAC users is well researched in the clinical setting, it has not been sufficiently implemented in practice (Light & McNaughton, 2015).

Establishing communication partners to provide meaningful demonstrations of language skills is necessary. Parents, teachers, and children require support in navigation and use of assistive technology to maintain meaningful interactions and promote communication independence (Kaiser & Roberts, 2013; Light, 1989; Sanders, 2017; Senner & Baud, 2016). Having a child with a communication disorder does not make the parent an expert in technology any more than providing a child with technology ensures development of communication (Cockerill, et al., 2014; Light, & McNaughton, 2012). Because communication (not just speech alone) is a building block to literacy, it is important to provide children with the opportunity to develop these skills early (Light, & McNaughton, 2012). When children experience communication deficits, brain development and cognitive ability is dramatically impaired and

can lead to educational and social isolation as well as difficulties with future employment (Topia & Hocking, 2012).

A lack of qualified AAC providers in schools and clinics is a barrier to ensuring children with complex communication needs (CCN) develop communication competence (Crisp, Draucker & Ellett, 2014; Sanders, 2017; Senner and Baud, 2017). When communication services are provided, a service gap exists in promoting carry over of services from the school or clinic setting to the home and community. In addition, skills are usually taught in isolation making generalization outside of therapy difficult (Cockerill, et al.; 2014; Granlund, Bjorck-Akesson, Wilder & Ylen, 2008). True communication competence involves the use of communication for multiple functions. Not only is communication used to meet basic needs, but to develop closeness with others (Light, 1989). Lack of support prevents caregivers from facilitating the use of their child's communication device, becoming skilled communication partners, or developing closeness with their child (Crisp et. al., 2014; Mandak, O'Neill, Light & Fosco, 2017; Sanders, 2017; Senner & Baud, 2017).

A study conducted by Sanders (2017) found the majority of parents request support to assist their child in using AAC, yet 52% were offered less than 3 hours of support. Some parents were unable to access support at all. When asked to rank the most critical areas for support, parents overwhelmingly wanted assistance with navigation and learning ways to help their child use AAC. Furthermore, parents reported in-person support far superior to Skype, email, or phone support. Parents also found online video tutorials helpful. When AAC is not adequately supported, abandonment of AAC is common and communication remains stunted with negative long-term consequences (Crisp et. al., 2014; Granlund et al., 2008; Anderson, Balandin, Stancliffe, & Layfield, 2014). Many children can make 1-2 simple requests with AAC quickly. However, becoming a competent ACC user requires approximately two years of coaching and

practice; the longer the child goes without training the longer acquisition takes (Ballin, Balandin, Togher, & Stancliffe, 2009). This contributes to development of challenging behaviors such as screaming, crying, hitting, biting, wandering, and self-injury (Andzik, Chung, & Kranak, 2016; Fragale, Rojeski, O'Reilly & Gevarter, 2016; Hall & Graft, 2010), device abandonment (Johnson, Inglebret, Jones & Ray, 2006), and lack of skill development for employment and independence in adulthood (Prizant et al., 2003).

Research Question

More than half of children using AAC are non-proficient in their communication (Andzik Schaefer, Nichols & Chung, 2018; Bellomo, 2016). Teaching caregivers to model the use of AAC to their child is one way to increase communication competency. The National Joint Committee on the Communication Needs of Persons with Severe Disabilities Members (2016) found 96% of individuals with profound intellectual and developmental disabilities were able to advance their communication skills with proper intervention. The purpose of this study was to determine if participation in a social-learning group affects the caregivers' frequency of using their child's AAC device to communicate with their child.

Hypotheses

For caregivers of children who use AAC devices:

1. Participation in a social-learning group will increase the caregiver's frequency of modeling using their child's AAC device in the home when compared to baseline.
2. Participation in a social-education group will increase the caregiver's frequency of modeling using their child's AAC device in the community when compared to baseline.

Concepts

Bioecological system. A system of multiple environmental subsystems which together influence human development over time (Bronfenbrenner, 1986). Changes in one system affect changes in the other systems (Topia & Hocking, 2012).

Communication competence. The ability of an individual who uses AAC to develop effective and efficient communication in four interrelated domains (a) linguistic, (b) operational, (c) social, and (d) strategic. Communication competence also encompasses psychosocial influences such as motivation, confidence, and listener support (Light, 1989). It is essential for meeting one's needs, participating in society and to share experiences with others. Therefore, the inability to communicate has a detrimental effect on happiness and well-being (Topia & Hocking, 2012).

Happy and meaningful life. Defined by the ability to participate fully in education, employment, family and community activities that are social, political and recreational in nature. These activities provide enjoyment and contribute to health and well-being. Participation implies active engagement or to join in an activity as opposed to simply being present or attending (Light & Mc Naughton, 2015). What makes a person experience a happy and meaningful life is unique for all individuals but largely determined by culture and society (Bronfenbrenner, 1986). In the treatment of disabilities, there has been a recent paradigm shift from disease-oriented intervention to performance enhancement, health and well-being (Topia &Hocking 2012). Families of children with disabilities want their children to have happy and meaningful lives (Light & Mc Naughton, 2015).

Level of independence. The highest level of functioning in which a person can perform a task without the help of another person. Level of independence that is supported by adaptive devices and use of adaptive supports increases an individual's level of independence that could

not be achieved without the support. In contrast, support from another person decreases level of independence even if the individual is able to complete more activities with personal assistance. An individual may have multiple levels of independence. For example, a person may be able to independently make a bed using a visual schedule. The visual schedule enables a high level of independence for this task. However, the same individual may require the help of another person to cross the road safely. This example illustrates a lower level of independence in road crossing behaviors because of the need for personal assistance to complete the task.

Definitions of Terms

Augmentative and alternative communication. The use of technology (written, computer software, signing etc.) to supplement spoken language or aid in understanding language when a child or adult has speech and/or language impairments. Augmentative communication is a method of communication that supplements spoken language. Alternative communication replaces spoken language for a person with no intelligible speech. AAC technology is referred to as (a) no technology, (b) low technology, (c) high technology. Examples of AAC technology are provided in appendix A **(**American Speech-Language-Hearing Association, 2018).

Approximations. Vocalizations or attempts to vocalize words that sound almost correct but not exact.

Autism spectrum disorder. A group of disorders characterized by deficits in social communication and repetitive or restrictive behaviors that interfere with daily living. Deficits and behaviors range from mild to severe (Harstad, Fogler, & Barbaresi, 2015).

Behavioral skills training (BST). An Evidence-based teaching strategy that includes five steps: (a) instruction (b) modeling (c) practice (d) feedback and coaching (Parsons & Rollyson & Reid, 2012).

Cerebral palsy. A disorder affecting motor movement and control of the body including communication and behavior (Christensen et al., 2014).

Communication. A behavior that involves the exchange of information between at least two people. The most basic form of communication is functional communication. A person communicates basic needs such as, “help,” “I need to use the bathroom,” “I want to eat,” (ASHA, 2018). Communication is a basic human right (Brady et al., 2016).

Communication partner. A communication partner can be the receiver or giver of information in a conversation with the AAC user or act as a facilitator. A facilitator makes communication easier for the AAC user by assisting the AAC user in conveying or exchanging messages, or seeking information to another receiver (Granlund et al., 2008).

Community. An environmental system in which a person lives and interacts daily. It includes the physical location as well as other people that may be present in the location. Places may include school, home, work, businesses, places of worship and recreation (Bronfenbrenner, 1986). People in a community usually have similar interests and participate in similar activities.

Community setting. A place accessible to the general public. This is the context in which the modeling intervention is embedded (Granlund et al, 2008).

Complex communication needs. The needs of an individual with severe communication difficulties including individuals living with autism, cerebral palsy, down syndrome and those who use AAC. The impairment may affect speaking, understanding language, and motor ability to form words. Individuals with complex communication needs cannot meet daily needs with speech. (Beck, Stoner & Dennis, 2009).

Down syndrome. A disorder caused by trisomy of human chromosome 21. It causes physical and intellectual impairments including language and communication (Barbosa, et al., 2014).

Language. A system of symbols organized by rules to convey information (ASHA, 2018).

Modeling. Teaching an activity by using demonstration.

Participation. An active engagement in education, employment, family and community activities that are social, political and recreational in nature. “Communication is the simple form of participation” (Chan, cited in Topia & Hocking, 2012).

Perceived self-competency. Individuals’ belief to perform a particular task (Bandura, 1977).

Social-learning group. A group of people with similar interests who gather to perform an activity and learn information pertinent to the interests of the group.

Speech. Communication using voice.

Need for the Study

Approximately 90% of SLPs provide direct services to children with ASD in the school setting while providing indirect consultation to special education teachers who teach children with ASD (Sanders, 2017; Mandak & Light, 2018). However, not all SLPs have received specialized training in AAC. This has created a shortage of expert practitioners in geographical locations. Not only do families of children with ASD and other developmental disabilities report problems coordinating and securing support (Mandak & Light, 2018), but frequently receive service from multiple disciplines including, occupational therapy, applied behavior analysis, and speech-language therapy. It is important for all practitioners serving non-verbal children to be adequately trained in AAC strategies to promote future development of communication after initial evaluation and acquisition of AAC. Practitioner education should include training in family support strategies related to AAC intervention.

Nurses' role. Advanced Practice Nurses (APN) are increasingly filling the gaps with specialization in caring for the family living with DDs. Nurses are usually the first point of contact for families with children having DDs, and excellent choices as primary providers and long-term coordinators of care. APNs have a strong educational background in collaboration, advocacy, and case management. Collaboration with an APN ensures integrity of treatment programs across disciplines necessary to meet communication goals.

Family-centered services are important since the family will spend the greatest amount of time with the child (Bellomo, 2016; Mandak et al., 2017). A child's lack of functional communication is a contributing factor to the family's social isolation, productivity losses, caregiver stress and financial burden which continue through the lifespan (Buescher, Cidav, Knapp & Mandell, 2014; Mandak et al., 2017; Van Tongerloo, Van Wijngaarden, Van der Gaag, & Lagro-Janssen, 2015). Research shows that interventions to support communication can be taught in the classroom and at home, however, few studies have been conducted on teaching communication in the community (Logan, Lacono & Trembath, 2017; Senner & Baud, 2017, Stadskleiv, 2017). APNs are skilled at developing and sustaining therapeutic relationships with patients, families and communities (American Association of Colleges of Nursing, 2006). These attributes allow the APN to pioneer delivery models such as a social-learning group to foster development of communication skills for children using (AAC) and their caregivers.

Outreach. Light and McNaughton (2015) stressed the need to create real-life communication opportunities in the community with families as these were seldom targets in AAC education. Creation of social groups led by practitioners allow greater distribution of services in areas where a shortage of providers exists. In addition, when students of health professions, such as nursing students, occupational and speech therapy students, are also included in outreach, resources become exponentially more plentiful. Innovation then creates an

interactive way for caregivers to access support and decrease isolation where little opportunity in the community currently exists. Children will benefit from development of social language skills required for making friends and becoming independent. Caregivers will benefit from an opportunity for meaningful participation in their child's care, fostering potential relationships, increased advocacy skills, and specialist care at minimal cost (Hall & Graft, 2010).

Assumptions

1. Families want their children to experience a happy and meaningful life.
2. Children using AAC want to participate in their environment.
3. Children using AAC have something to tell.
4. Families want to extend the circle of communication partners for their child though AAC use.
5. Families desire independence and communication competence for their child.
6. Families have limited resources and/or access to support services which foster communication.
7. Families desire social outlets.
8. Families value the use of technology for education delivery and support.
9. People learn best through education, practice and feedback models.
10. Modeling is effective at increasing AAC use among AAC users.

Chapter 2

Review of Related Literature

Despite the body of research supporting the use of modeling in AAC, children and families struggle to effectively and efficiently use it (Andzik, et al., 2018; Bellomo,2016, Logan, et al., 2017). A lack of qualified AAC providers is a barrier for children with CCN to develop

the skills for effective communication (Crisp et al., 2014; Sanders, 2017; Senner & Baud, 2017). Given the importance of communication for independent functioning later in life, a review of the research was undertaken to determine whether a social-learning group would be beneficial. This section reviews studies that examined perceived efficacy, evaluated methods for promoting communication skills of AAC users, or generalized competence across settings. Studies were evaluated to determine content, delivery, and evaluation methods for communication partner training in the community setting. In addition, Bronfenbrenner's Bioecological Systems Model is presented as a framework for this study.

Perceived Efficacy and Module Design

The term parental efficacy is a term frequently confused with competence. Efficacy is the belief that one can be successful performing an activity. Therefore, efficacy is both the knowledge and belief that the action can be completed. (Bandura, 1977). Competency differs from efficacy because competency refers only to the ability of task completion. (Wittkowski, Garrett, Calam, & Weisberg, 2017). Perceived self-efficacy (PSE) is a predictor of parent functioning. Steca, Bassi, Caprara and Fave (2011) evaluated PSE of 130 parents and their adolescent children using 25 items from the Perceived Parental Self-Efficacy (PPSC) Scale. When comparing parent self-ratings, children of parents with high PPSE scores were more motivated to perform in academics and develop independence in associated tasks. In contrast, adolescents with parents who had low PPSE were less motivated to engage in academic activities. Therefore, efforts to increase parental PSE may be valuable in developing communication competence in children who use AAC.

According to Bandura (1977) several factors contribute to the perception of self-efficacy, including one's previous mastery with a task and watching others in a similar situation. In order to perform successfully, the skills of the task must be understood (Gist &

Mitchell, 1992). This framework supports parent participation in knowledge-based interventions to support AAC users. Senner and Baud (2017) conducted a study examining the use of an eight-step instructional model to train school staff in modeling. The model resembled BST consisting of (a) instruction (b) modeling (c) practice (d) feedback (e) coaching (Miltenberger & Roberts, 1999). Behavior skills training not only includes acquisition of knowledge necessary to perform modeling but also includes practice and coaching. Senner and Baud (2017) successfully used these steps to increase the frequency of teachers modeling AAC in the classroom environment. Applying Bandura's theory and BST can be used to create a social-learning module for a group of parents.

Parent perceived efficacy is not the only valuable perception. Tönsing and Dada (2016) employed a mixed method design to measure teacher perceived competence with AAC. Teachers rated their ability to support users with a 4-point Likert scale resulting in a mean score of 2.5. Despite feeling somewhat competent, more education in supporting AAC users was desired by 92% of the respondents. Lack of knowledge was identified as a barrier to supporting AAC user by SLPs, parents, and teachers (Anderson et al., 2014; Bellomo, 2016; Crips et al., 2014; Clifford & Minnes 2013, Sanders, 2017; Stadskleiv, 2017).

A participatory observational study by Stadskleiv (2017) noted parents of children with AAC devices are unfamiliar with device programming and usage. This researcher launched a support group for six families whose children participated at a pediatric AAC habilitative unit. One of the aims of the study was to assist parents to develop competence and confidence with AAC. Both parents and professionals participated in group discussions. Field notes from this study revealed six themes that commonly occur in AAC literature: (a) child characteristics, (b) general development, (c) communication devices (d) AAC, (e) language development (f) policy. In concert with Bandura's framework, providing knowledge support

to a group of parents enhanced parental competence through shared experience with others in similar situations. Evidence was drawn from reciprocal participation and development of community initiatives by the parents. Results of this study cannot be solely contributed to the support group. History and maturation must be considered in this five-year study.

Online Instruction Modules

Bellomo (2016) administered the Usage Rating Profile-Intervention Revised (URSP-IR) to measure self-efficacy of parents of children who use AAC and learned modeling technique from online multimedia training materials. The URSP-IR is a 5-point Likert scale questionnaire consisting of 40 questions. The pre-test and pos-test format revealed increased knowledge in effective communication strategies led to increased parental self-efficacy of modeling techniques. This demonstrates efficacy is increased with knowledge and that online education is viable method for parent training in modeling techniques. Similarly, Clifford and Minnes (2013) utilized an online format to provide emotional support to parents of children with autism. Satisfaction surveys of the participants found the format to be acceptable as a method to provide support despite lack of statistical significance in measures parenting stress or positive perceptions between the support group and control. Similarly, Sanders (2017) found that parents preferred receiving AAC support in person meetings or online training videos as opposed to phone or email. Research indicates that parenting a child with language disorders is extremely stressful (Buesher et al., 2014; Clifford & Minnes, 2013), and parent support groups can be helpful to families (Bellomo, 2016; Clifford &Minnes, McNaughton, et al., 2008).

Community Setting

A systematic review by O'Neill, Light, and Pope (2017) identified partner modeling, long-term communication ability as well as intensity of intervention as research priorities in

the area of AAC. Researchers screened 731 records for the review. Only 3 of 28 included in the review involved teaching modeling in a group, one of which included interventions in the community. Further research is necessary to determine how communication skills learned during the school years support independent living after graduation.

A child's communication competence cannot be delegated to one person. Parents, teachers, and providers must support language development of AAC users across activities, settings and people (Bronfenbrenner, 1986; Mandak et al., 2017; Stadskleiv, 2017). Seven parents of individuals with CP who used AAC devices participated in a focus group study to examine the challenges of learning with ACC. Six themes emerged from the online discussion including opportunities for use in the community setting (McNaughton, et al, 2008). Parents reported struggling with communication in the community setting. One parent stated, "Although it is quite portable, she rarely uses it out of the house…" (McNaughton et. al., 2008, p 50). In addition, parents expressed the lack of friendships with peers and activities available in the community created barriers to communication by leaving nothing interesting to talk about. While there are limited studies examining AAC use in the everyday setting (Logan et al., 2017), the body of research is steadily growing in the school realm for children under age 12 and their communication partners.

Many studies involving preschoolers have used playtime activities either at school or in the home to create natural opportunities for language, but rarely generalized to the community setting (Kasari et al., 2014; Kent-Walsh, Binger, & Hasham, 2010; Romski et al., 2010). Dada and Alant (2009) evaluated modeling during arts and crafts as well as food preparation activities providing more hopeful potential for generalization toward independent living skills. While participants in this study were upper elementary age children, few have studied AAC intervention in adolescents and adults.

Parents are not the only group struggling in creating communication opportunities. A study by Anzik, Chung and Kranak (2016) reported in a study of 23 students ages 6-11, were presented with approximately 17 communication opportunities per hour during the school day. While this may seem like a lot, when the opportunity was presented the student only had access to their AAC device about half the time and the majority of the interactions were presented by adults. Creating opportunities for students with AAC to develop communication competence must be deliberate and planned (Kent-Walsh, Murza, Malani & Binger, 2015).

Modeling Intervention

There are several methodologies used to promote and develop communication skills in children who present as non-verbal. The most common methods for promoting communication of AAC users are aided language stimulation (modeling).

Typical children learn to speak by hearing language spoken. Children who use AAC need to have the same symmetry between language taught and language produced. Modeling is the visual demonstration of language by a communication partner (Sennott et al., 2016).

Studies have shown that communication attempts of an AAC user increase when modeling is part of the treatment package (Beck, et al., 2009; Dada & Alant, 2008, Kasari et al., 2014, Rosa-Lugo, & Kent-Walsh et al., 2010; Kent-Walsh, Binger & Buchanan, 2015; Romski et al., 2010; Solomon-Rice & Soto, 2014) or when used alone (Dada & Alant, 2009; Drager, Postal, Carrolus, Castellano, 2006; Harris & Reichle 2004; Hughes et al., 2000; Romski et al., 2010). The number of times a communication partner should provide a model to be effective remains unclear. Researchers have measured the frequency of modeling by both percentage of opportunities (Dada & Alant, 2009) or number of times per session (Binger, Kent-Walsh, Ewing, &Taylor, 2010; Drager et al, 2006; Binger & Light, 2007) as well as acquisition of target vocabulary (Drager et al., 2006, Dada & Alant, 2009; Romski et al., 2010; Soloman-Rice &

Soto, 2014), or number of communicative turns (Beck, et al., 2009; Sennot et al., 2013). Systematic reviews (Sennott et al., 2016; Lynch, McCleary, & Smith, 2018) and meta-analyses (Kent -Walsh, et al., 2015; O'Neill et al., 2017) examined 35 different studies providing modeling effectiveness. Visual inspection of data shows most studies involve children ages 3-12 and occur in school or a research room. Story book reading is the most common activity used to either provide direct intervention or teach communication partners how to model. Multiple studies have shown success with teaching modeling to teachers (Binger et al., 2010; Senner & Baud, 2017; Chung & Carter, 2013) parents or caregivers (Beck et al., 2009; Bellomo, 2016; Kent-Walsh et al., 2010; Rosa-Lugo & Kent-Walsh, 2010) and peers (Hughes, et al., 2000; Trottier, Kamp & Mirenda, 2011; Lilienfeld& Alant, 2005) as communication partners.

Studies have shown variability in the amount of pre-service training partners need to perform modeling effectively (Bellomo, 2016; Binger et al., 2010; Binger, Kent-Walsh, Berens, Del Campo, & Rivera, 2008; Chung & Carter, 2013; Senner & Baud, 2017). The minimum amount of pre-service training delivered to peer communication partners was 45 minutes, however, due to lack of results additional training was necessary (Chung & Carter 2013). Two separate parent training programs provided approximately 2.4 hours of training (Binger et al, 2008 & Binger et al., 2010), while a third provided almost 6 hours of parent training (Rosa-Lugo & Kent-Walsh 2010) to demonstrate successful gains. Bellomo (2016) provided 1.5 hours of online training and measured parental knowledge and PSC increases. However, this study lacked direct measurement of the learned skills. Senner and Baud (2016) demonstrated modeling technique in the classroom during the course of normal ongoing class activities. During the normal classroom activities, the researchers provided coaching and feedback to successfully increase the frequency of modeling of teachers and paraprofessionals. There was no special preparation of materials. Applying a similar method

of coaching and feedback in the community combined with instruction via social media, suggests that modeling can be taught to caregivers in a similar fashion.

Theoretical Frameworks

Research suggests that family-centered services are needed to successfully support development of communication skills in AAC users (Fraenkel, 2006; Granlund et al., 2008; Mandak, et al., 2017; McNaughton et al., 2008). In addition, there is little research examining the best way to target communication skills in the community through the lifespan (Light & McNaughton, 2015).

Despite the recognition by professionals of the need for collaboration and family-centered services, a lack of a specific framework and support continuum for delivering services continues to be a barrier (Mandak et al., 2017). Beukelman and Mirenda (2013) created the Participation Model for Augmentative and Alternative Communication, which highlights the importance of environmental supports and barriers of optimal AAC use. Despite this model's inclusion of the family and environment as essential, the focus of AAC intervention continues to focus on the individual rather than the family unit (Light & McNaughton, 2015). In addition, the International Classification of Functioning, Disability, and Health (ICF) provides a common language for describing function, and marries social and restorative functions. It is both a classification system and conceptual framework. Despite early adoption by American Speech-Language Hearing Association (ASHA) few professionals have adopted this model. ICF is considered a bioecological model. While the model takes into account personal factors such as life experiences, social, education, and age etcetera, they are not included in the classification system. This may contribute to the lack of adoption (Blake Huer, & Threats, 2016).

In addition to guiding areas of future research, application of a theoretical model can provide a purposeful direction for community interventions. The theoretical framework of this study is based on a bioecological systems approach developed by Bronfenbrenner (1986). Similar to social-learning theory (Bandura, 1977), ICF Model (WHO, 2001) and behaviorism (Skinner, 1974), this model attributes learning and development to environmental influences. Four foundational concepts imbedded in the bioecological model include: process, person, context and time. Together, these four interconnected systems influence human development (Tudge et al, 2016). Human development encompasses development of communication and independence.

Bioecological Model Application

Bronfenbrenner (1986) suggests processes are the interactions that occur between environmental objects and other people in the environment. The primary focus of this study is examining the reciprocal processes that occur during interactions between a family and the child while using the AAC device in the community. The concept of person refers to individual characteristics and experiences that may motivate a person or family to respond or participate in daily activities (Bronfenbrenner, 1986; Bandura, 1977). A non-verbal child's inability to have basic needs met without an AAC method exemplifies both motivations and characteristics shared by all participants in this study. Likewise, a family's inability to understand the child affects the child's development and the family's motivation to learn AAC.

Environmental subsystems represent the natural contexts in which children and families live. There are three environmental subsystems (a) microsystem, (b) exosystem and (c) macrosystem (Bronfenbrenner, 1986). For example, the home is considered a microsystem where a child spends the most time interacting with immediate family members, extended family

members and possibly other caregivers. Each environment encompasses different motivating factors that encourage or discourage use of AAC by the family or the child.

Exosystems are systems that influence the child even though the child may not be present at the time an interaction is occurring (Bronfenbrenner, 1986). The school is an example of an exosystem. During school, the child learns literacy, social skills and how to access AAC. While at home or in the community, the teacher is not present; however, the daily learning that occurs at school influences the child's social actions and use of AAC. The same is true for the professional environment. The professional environment may consist of doctors, nurses, SLP, occupational and physical therapists, as well as behaviorists. Therapies and care provided in professional settings influence the child's development at home, school and the community even though the practitioner is not present. Because each exosystem exerts influence on another exosystem, they are represented by overlapping circles in the diagram representation (see Figure 1).

Mesosystem, represented by the grey, circular, arrow, overlay illustrates the continuous multi-directional relationship that occurs between multiple settings or systems. For example, professionals interact with the family, school, and community by providing appropriate supports to foster communication development. The school setting interacts with the family, professionals, and the community to achieve the same goal. The relationship between the family microsystem and the school exosystem, the community and school exosystems is multi-directional.

The community is a group of people who gather outside the home setting and share similar interests and activities. A parents' work place and social supports reside in the community. Applying Bronfenbrenner's model, community can be viewed as a both a macrosystem and exosystem. Place of employment, recreation opportunities, social or religious

gatherings and local businesses are examples of exosystem contexts that affect a child's adaptation. However, societal norms and values in regard to disability awareness, access, and prejudices can also affect these opportunities. In the United States, the American Disabilities Act (1990) promotes inclusion, however, similar laws may not be present in other countries or cultures. In this context the community is viewed as a macrosystem. A social-learning group that meets at a restaurant represents an exosystem. When a family and a child with AAC patronize a restaurant the family microsystem moves into the community exosystem. The restaurant design, other patrons, service and previous experience affect the success or failure of the child's interaction within that system. The restaurant as a macrosystem is exemplified by the ability of the child to access the menu whether in print or pictures. Willingness of staff to allow sufficient wait-time for the child to formulate an order on the AAC device, eye contact and directing questions toward the child instead of the parent when the order is placed. While such actions are seemingly normal for most, societal norms are actually responsible for attitudes toward individuals with disabilities and represent the macrosystem affecting communication development. Services and therapies should be designed to provide the families of AAC users the necessary supports to develop communication competence and independence to children who use AAC.

The final system in the framework is a chronological system. Time is a chronological system that occurs both within and across subsystems as well as though the lifespan. As time passes, there is a directional process of development. Development can move forward, remain stagnant or regress. Health, learning and level of independence also move along a continuum with the progression of time. The corners of the triangle represent the chronological continuum. For example, a child may experience a level of independence with communication in school, but not the community. Likewise, level of communication once obtained may regress if the child

experiences a change in health, educational placement or family disruption such as a divorce or moving to a new home. The double-headed arrow represents the passage of time within subsystems and though the lifespan. When regression occurs, time is considered "lost".

Typically, this model is represented by concentric circles. While continuous in nature, a circle has no end and no beginning. Communication goals have a clear beginning and end; it is how progress is measured. Therefore, the triangle is a better representation of the processes involved in growing communication competence. Communication competence, is the apex of a pyramid requiring a strong foundation of support in health and learning. Coordination of goals through all systems creates a synergy toward independence and communication competence.

Application of the bioecological systems model recognizes that a child cannot be separated from the family unit and the family unit is affected by all the feelings, interactions, and roles of other family members. Together the family unit interacts with each other and subsystem contexts such as work, school, and the community (Mandak, et al. 2017). In turn, these interactions foster development of communication competence across time for the entire family. While communication development is concurrently occurring and being supported in other subsystems, the focus of this study is only the community subsystem.

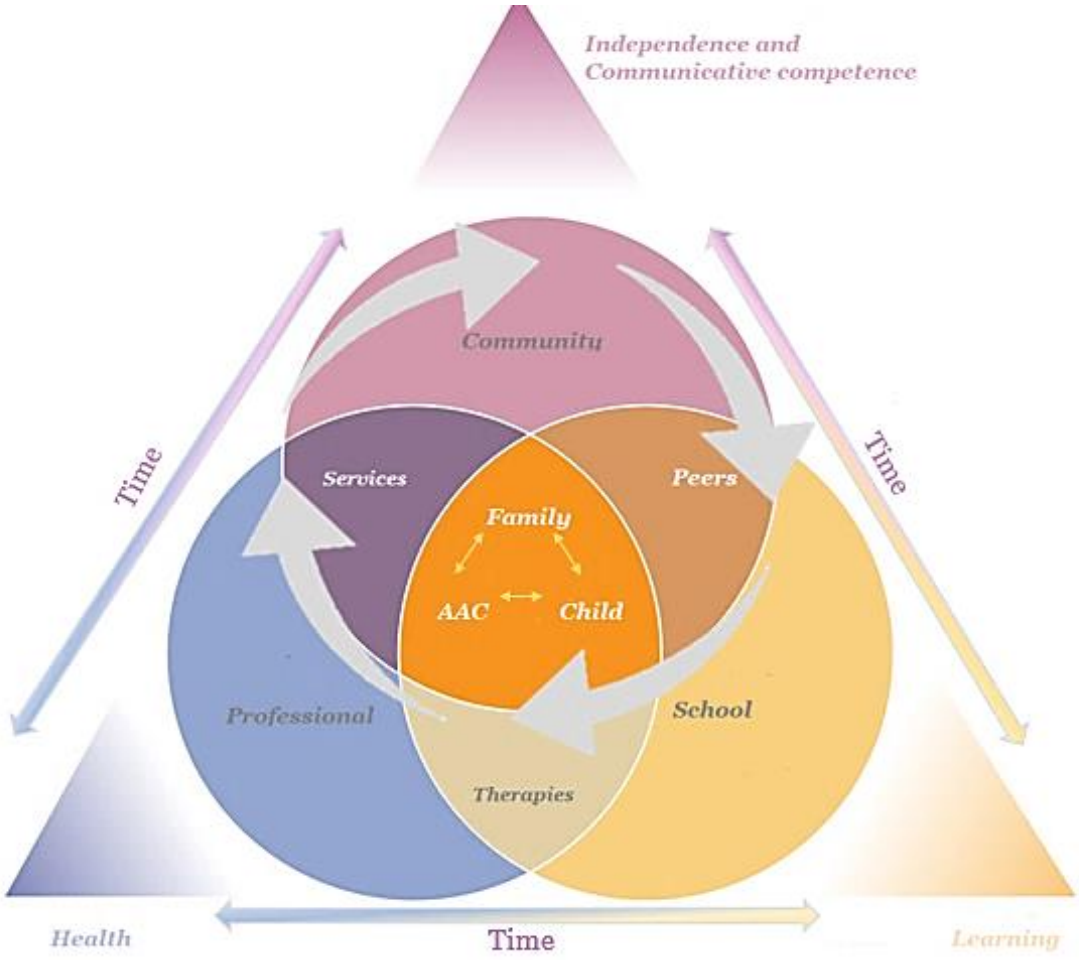

Figure 1. Theoretical Structure adapted from Bronfenbrenner's Bioecological Model

This section reviewed research studies conducted with the aim of increasing communication partners effectiveness in modeling AAC to children with communication challenges. Modeling was found to be an effective intervention for increasing a child's AAC skills and communication ability. Methods for disseminating information were also examined. Online instruction was found to be an emerging method for teaching communication partners. Finally, Bronfenbrenner's Bioecological Model was explained. Applying bioecological concepts can guide interventions for families and children with AAC allowing participation in their communities to the highest level possible.

Chapter 3

Methodology

This section will describe the sample, methods, and design for the study. This section defines a social-learning group as the independent variable in this pilot study. In addition, the measurement of the dependent variable is also identified.

Recruitment

After Institutional Review Board (IRB) approval, a convenience sample of three families was obtained from a Northeast Florida Community. Participants were recruited from email, social media sites, as well as already established local public schools' notification system, local children's hospital departments', private special needs schools', and private therapists' email distribution lists and flyers. All participants met the inclusion criteria: (a) live within 45 miles of Jacksonville, Florida, (b) have the physical ability to participate in activities such as bowling, art, and eating at a restaurant (c) be free from behaviors of self-injury, aggression toward others, and property destruction. (d) have access to AAC, (e) be engaged and present for the entirety of the group (f) provide informed consent or assent (g) legal guardian of the child who uses AAC. Excluded were persons whose children had age appropriate language skills, younger than six years or older than 13 years.

After consent, assent, and HIPAA authorizations were obtained, demographic information about the parents and their child AAC user was collected by the researcher using a survey and personal interview (see Appendix B).

Participants

Demographic information was collected in the participants home with children present. Interviews lasted between 30 and 40 minutes. The following information was collected at the

initial interview; parent's age, child's age, number of years using current device, type of device, parents gender, child's gender, child's diagnosis by parent report, child's grade, parent's highest level of education, parents judgement of child's estimated mental age and prior exposure to AAC training (Terry, 2015). Demographics for the child participants are displayed in a Table 1. Demographics for the caregiver participants are displayed in Table 2 (Sylvia & Terhaar, 2014). Participants are identified by alias to maintain confidentiality.

Table 1. Demographics for children participants.

Child alias	*Gender*	*Diagnosis*[a]	*Age*	*Estimated Age*	*Time with current device*	*Type of school*
Katie	F	ASD, CP	11y 3 m	2	<1y	Public
Tonya	F	DS	11y 1m	6	<1y	Public
Tyler	M	ASD	13y 4m	4	>3y	Public

[a] ASD: Autism Spectrum Disorder; CP: Cerebral Palsy; DS: Down Syndrome

Table 2. Demographics for caregiver participants.

Caregiver alias	*Gender*	*Age*[a]	*Ethnicity*[b]	*Education*	*Received training*	*Uses at home*	*Takes in public*
Katie's Mom	F	40	W	College Graduate	Yes	Some	Seldom
Tonya's Mom	F	50	AA	Some College	No	Never	Never
Tyler's Nanny	F	30	W	College Graduate	No	Seldom	Never
Tyler's Dad	M	40	A	Graduate School	No	Never	Never

[a]30: 30-40 years old, 40:40-50 years old 50:50-60 years old
[b] W: White; AA: African American A: American

Characteristics. Three caregiver(s) and children teams with children age 11 to13 who use a speech generation device (SGD) as their primary method to communicate agreed to participate in the study. The caregivers consisted of the biological mother for two children, and the biological father and nanny for the other child.

All of the children attended public schools. Two children attended schools as same-age typically developing peers, but were in self-contained special education classrooms. The other child attended a center school, specially designed to educate only students with special education needs. The public school suggested and provided an AAC device to one of the children. The other two children were provided devices through private speech therapist evaluations and treatment. Two of the children made some word approximations understood by the family, but not understood by people unfamiliar with the child. One child made sounds but no understandable word approximations.

Type of device. All of the children used speech generation AAC on a portable electronic device (iPad or Windows tablet) and spoke English. Each of the children's devices ran different communication applications. The following applications were in use: Saltillo TouchChat-HD with WordPower^{TM} with 108 icons on the display, AssistiveWare® Proloquo2Go® with 8 icon display, and tobiidynavox Snap + Core First for Windows, with 4 icons visible (un-hidden) on the home screen. All device vocabulary contained mostly single words or single words and symbols organized with core words on the home page. Vocabulary was also color-coded to identify parts of speech (verb, noun, adjective). Snap + Core First for Windows contained more pre-programed phrases than the other two devices.

Motivation. The interview ended with an open-ended question asking the caregiver to describe any training received about their child's communication device. This question prompted participants to express their motivation for responding to the study.

Tonya's mom who had no training with the device stated she did not know how to use Apple products. Tonya's mom stated, "She [Tonya] seems to know how to use it, she's used it once or twice to ask." Although Tonya's mom can understand her daughter's approximations, she stated the school suggested the device because Tonya is difficult to understand. Tonya's device was provided by the school.

Katie's mom has previously participated in a study for fostering communication. The study was conducted by a university to evaluate a picture exchange method and did not use an SGD; however, the intervention could be considered as a prerequisite skill to acquiring SGD.

On a separate occasion last fall, she also completed a device trial with SGD from a device loan program. Loan programs allow AAC users to trial devices prior to purchase to ensure a proper match with the user's abilities. The device had nine programmable buttons and stored up to 45 messages. Paper templates could be inserted into the device to change the meanings of the nine program button options. The parent reported that for the first time Katie was very responsive to AAC. In just a few weeks she could ask for highly preferred items, however, it was cumbersome and limiting for the family. Her mom stated, "We don't want the device to tell us what she can do." The family had to return the loaned device at the end of the loan period and chose not to purchase it.

Katie's mom is familiar with some concepts of modeling, but does not currently use it. Katie received her current device approximately one month before the study began. Her mother reported that Katie does not locate the device and use it to communicate. The family is able to understand her body language for meeting her basic needs. Participation in the study stemmed from an interest in learning how to use the device in the community and "How to get her to bring it to us, or let us know she wants to use it to communicate or what we are going to do with it," as stated by Katie's mother.

Tyler's nanny has cared for him after school for 5 years. She agreed to participate in the study when approached by the parent because she would like to learn how to help him communicate better.

She states that Tyler typically uses the device to ask for food. Often, he will point and make vocalizations, but is not understood. She reported no previous training in AAC. When his nanny first began working for the family, she was shown by the parent how to navigate to the food page and simple activities that Tyler may ask for. The family also requested she take the device on outings. While she does take the device in public with him, he does not use it. She stated he used it at the zoo one time when she asked, "What animal is that?"

Design

A mixed method design was used to determine if participation in a social-learning group affects the frequency of the communication partners' modeling (Hitchcock, Nastasi, & Summerville, 2010; McDougall, Hawkins, Brady, & Jenkins, 2006). A single-subject experimental A-B design (SSD) provided quantitative data for intervention effectiveness while non-experimental qualitative methods yielded descriptive phenomenologic data. In the SSD, each individual participant served as his/her own control. Graphing of data allowed visual analysis as a measure of comparison from week to week, as well as relationships between the baseline and experiment conditions over time (Cooper, Heron, & Heward, 2007; Hitchcock et al., 2010). Social media comments and posts as well as postintervention satisfaction survey provided data for qualitative analysis.

Rationale for SSD

Given the low incidence of the population being studied, determining a sample size for a population study would be impractical (Balasubramanian, Shetty, TS, & Mani, 2017). Survey answer options are too restrictive and would not reveal details. Additionally, a SSD was chosen

because the subject serves as its own control across time when the treatment phase is applied (Hitchcock et al., 2010). Classic changing criterion design was considered as appropriate for evaluating the effects of teaching modeling expected to in a therapeutic direction is expected (Klein, Houlihan, Vincent, & Panahon, 2017; McDougall, et al., 2006), however, the length of the intervention would not allow enough data collection points to ensure stability (McDougall et al., 2006). In addition, modeling behavior is likely to develop through shaping. Changing criterion designs are not appropriate for shaping successive approximations of behavior (Cooper et al., 2007).

Using the multiple baseline design (MBD) for demonstrating experimental control is another way to demonstrate effectiveness of an intervention. However, MBD requires extended baseline data and participants to begin the intervention in a staggered fashion. Because the intervention being tested involved a social group, all participants must begin the intervention together. One person cannot be social without other participants. In addition, because the intervention is educational, one cannot unlearn material taught. This makes true reversal designs such as a single subject ABAB design impossible (Cooper et al., 2007; McDougall et al., 2006).

Intervention Materials

Before implementation of the social-learning group, several steps were taken to ensure the content validity and feasibility of the online learning materials. Three content expert reviewers who work with children and families using AAC were chosen from the disciplines of special education, speech language pathology, and applied behavioral analysis to review intervention materials. Each reviewer had a minimum of 5 years' experience in his respective field. Each reviewer was paid a $10.00 gift card upon completion of his review. Reviewers received content outlines for each week of the study via Facebook (Fb) Messenger. Each week included (a) written learning materials (b) video links (c) description of community activities and

(d) an invite to access the Fb page. No instructions were provided in regard to how to access the content on the Fb page. Reviewers did not have difficulty accessing the content and were able to view and "like" content without explicit instruction. Had the reviewers needed additional instruction, it would have been provided.

After reviewing the materials, experts completed a 10-question Likert scale survey developed by the researcher to facilitate and promote consistency of evaluation (see Appendix C). A mean score from all three experts established the quality of the materials (Castillo-Montoya, 2016). All experts "agreed" or "strongly agreed" the materials were appropriate and no revisions to the materials were recommended. One reviewer neither agreed nor disagreed to whether the community activities would provide sufficient modeling opportunities. This response was not surprising as it is the basis of the study. In addition, the use of the word "sufficient" in the question may have been too subjective considering the number of times a partner should model remains uncertain (Beck et al., 2009; Binger et al., 2008; Dada & Alant, 2009; Drager et al, 2006).

Written instructional material was provided by AssistiveWare® who is a leading pioneer in the field of augmentative and alternative communication (AAC) and assistive technology software. The company's mission is to help build a world without communication barriers, thus, granted copyright permission to use and adapt their teaching materials for this study (see Appendix D).

Videos links included in the training were accessible through YouTube. Videos were chosen to enhance explanations and demonstrate techniques explained in the written learning materials. Links were presented in the Fb unit material for each week. When a reviewer clicked on the link, a separate window opened and played the video. Videos included multiple exemplars

of modeling demonstrations from both professional and families in a variety of settings and devices.

Community activities were chosen for ease of accessibility and age appropriateness. The activities chosen for this study included: selecting and reading a book at the public library, making microwave mug cakes in a separate activity room at the public library, and attending an children's exhibit at the museum of science and history (MOSH). Due a scheduling conflicts, session two was conducted in the participant's home.

Procedure

After the participants were identified, the researcher met with the family in their home to complete consent and assent to participate. After consents were obtained, parent interviews were conducted in the home with the child present to collect demographics and baseline data.

Baseline. Participants chose a time in which they are normally home with their child. During the interview, participants were told to go about their normal routine. The researcher collected baseline data by documenting the number of times the caregiver used the AAC device with the child. At the conclusion of the interview if the participant had not interacted with the child using the AAC device, the researcher asked the caregiver the following question, "Can you use AAC to read a book to your child?" If the caregiver read a story, frequency data on the number of models provided during the interaction was recorded and reported as rate. If the caregiver was unable, a second request was made, "Show me an activity other than reading that you might be able to do with your child and their AAC". If the caregiver was unable, the researcher provided an empathetic statement, "I am excited you have decided to join the study," and concluded the interview. None of the participants were able to demonstrate the skill of modeling. A leave behind folder was provided to the participants with the start date of the study,

instructions to log in to the Fb study page, a copy of the signed papers as well as a contact number to reach the researcher.

Intervention. After the collection of baseline data, participants were invited to a closed group Fb page to access written and video training materials. The secret mode in Fb was applied to ensure confidentiality of the group. All caregivers gained access to the Fb group at the same time. Instructions for accessing the educational material on Fb, posting and research procedures were verbally explained and provided in writing to the parent at the initial interview. Caregivers were provided opportunities at the initial interview and subsequent weeks to ask questions, clarify information and withdraw from the study if they choose to do so.

Each week, on Sunday, participants were expected to access Fb to view new learning material. Training caregivers to perform the skill of modeling followed the protocol for conducting BST. The first step in BST is providing the participant with a written description of the skill. Step two includes demonstrating the target skill. Steps one and two were posted on the Fb page. Participants accessed the unit section to receive written instructions about modeling on AAC devices. Then, demonstrations of the skill were performed by the researcher or other AAC users in videos posted on YouTube. Links to videos demonstrating how to model AAC were embedded into the learning units. Learning units were designed to take less than 15 minutes to view.

The third step in BST requires the learner, or caregiver in this case, to practice the skill. After viewing the learning units in Fb, participants were asked to practice the new techniques at home or in the community with their children between group meetings. Each week parents were asked to subjectively report if the learned information increased the number of times modeling was utilized at home or in the community. This was measured by asking the parent to compare the use of their child's device to the previous week using a Likert scale with participant as "1" no

more use, “3” same use and “5” a lot more use. Engagement statistics automated by Fb were examined as a method to gauge parent participation as well as attendance at social group meetings.

Step four in BST requires the trainer, or researcher in this case, to provide feedback and coaching to the participant during practice. Once a week for three weeks, teams met to practice the new skills in the presence of the researcher. Prearranged, one-hour, community activities included reading, cooking, and visiting the MOSH. Data were collected on the caregiver’s frequency of modeling during the first 10 minutes of the session. This was done because behavior and attention of children with disabilities can be unpredictable in an uncontrolled environment. Next, feedback and coaching were provided to the participants. Additional data were collected on the caregiver’s frequency of modeling at subsequent meetings. During weeks two and three, the participants were exposed to addition information that was intended to improve modeling skills. Goals, methods and assessments for each week of the study are contained in the intervention module plan in appendix E. Each week followed the same procedure: view information on Fb, individual practice, group activity practice, data collection, feedback and coaching.

Using direct observation by trained data collectors and digital cameras, event recording was used to capture the frequency of modeling (Johnston & Pennypacker, 2009). Frequency was measured using tally counters. The researcher had active direct participation and provided coaching to foster use of modeling during the group activity. Tyler’s AAC system had RealizeLanguage™ data logging capabilities (Prentke Romich Company, 2014). Katie’s AAC system had Snap + Core First data logging feature and was activated through mytobiidynovox.com on day seven of the study. Usage reports indicate when users are most

engaged with their AAC, and the most frequently used messages. This allowed triangulation of data to assure validity.

Interobserver Agreement and Reliability

When repeated measures of the same event yield the same results, it is said to be a reliable measure. For example, if the same observer counts the number of caregiver models today, as counted in the video recording of the same event a week later, then reliability is established. Interobserver agreement (IOA) refers to the degree of which two or more independent observers report the same counts when measuring the same event. A high degree of agreement between observers ensures the target behavior definition is clear and that the data is believable and trustworthy (Cooper et al., 2007).

Data collectors were students recruited from a private, accredited, associate degree, nursing program. Release from clinical time was given as compensation. After completing the *Human Subjects Researcher Course*, observers were trained in data collection procedures. Because human error is the biggest threat to accuracy and reliability of data, observers received systematic training and practice (Cooper et al., 2007). Training lasted approximately two hours. Observers were trained to measure modeling behavior of the caregiver. They were provided a definition of what modeling is and what it is not. Multiple exemplars of modeling were provided by the researcher and through the use of videos. Videos demonstrated modeling in various settings with multiple AAC (SGD and static). Observers practiced and discussed modeling observations as a group during the training. One week later, IOA data were collected. IOA was pre-determined at 80%. Observers independently watched a series of six videos demonstrating modeling. They were instructed to record the number of models observed in each video. Once viewing was competed, IOA was compared between observers 1 and 2; 2 and 3;1 and 3 (See Appendix F).

For this study, the total count-per-interval IOA and mean count-per-interval IOA were greater than 93%. Each observer used the same observation code and measuring system. Observers were paired with a participant team. Observers independently measured the same participant at each event. Observer measurements were compared to 20% of the audio and video recordings by the researcher for accuracy.

Quantitative Data Collection

The first day of Fb access marked the beginning of the intervention phase. Participants came to the first activity having already viewed the educational materials on Fb 5 days prior. The independent variable was participation in a social-learning group. A social-learning group is a group of participants who meet for a social activity in the community while concurrently receiving education about their child's communication device. In this study, participation was measured when the participant viewed educational materials presented in Fb in addition to attending weekly community outings with their child over a three-week period. Caregiver modeling was the dependent variable in this study. Caregiver modeling occurs when the caregiver activates one or more key words in a spoken phrase on the child's SGD during an interaction with the child. An operational definition of modeling can be found in appendix G.

In addition, participants were asked to rate how often modeling was used at home and in the community each week. Subjective data were collected from the participants using a Likert scale (Appendix H). Participant collected data assist in providing social significance of the intervention.

Qualitative Data Collection

A 16-question, 5- point Likert scale post-intervention survey was used to generate qualitative data regarding modeling in a community setting. Participants were asked to evaluate the usefulness and quality of teaching via Fb and social group sessions. Survey data were

collected at the end of the last session. Questions one through twelve were rated by the participant as “1” strongly disagree, “3” neutral and “5” strongly agree (See Appendix I). Descriptive analysis for each of the 14 questions was reported by a mean score taking in to consideration reverse scoring for items 7 and 11 (Bandura, 2006). Questions 15 and 16 posed open questions which were analyzed and common themes reported.

Method triangulation using direct and video recorded observation, post-intervention surveys, device data logging and Fb posts was performed. Data triangulation identified convergence of data by cross referencing the satisfaction survey and Fb conversations with the single subject data. This added credibility of the design which does not have an extensive baseline or reversal phases (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014; Fusch & Ness, 2015).

This section examined a meso-level and micro-level description of the sample. The setting and procedures for quantitative and qualitative elements of the research design were described. Intra-observer agreement thresholds were discussed along with methods for evaluating validity and feasibility of the learning materials.

Chapter 4

Results

This chapter will discuss the analysis of data from quantitative and qualitative measures. The purpose of this pilot study was to determine the feasibility of social-learning group and its effects on caregivers of AAC users modeling techniques in both the home and community setting.

Models Per Minute

Measurements of caregiver modeling which included both home and community settings showed an increase in frequency over the course of the three-week study. Figure 2 presents the

number of models per minute each caregiver performed during a planned observation. Overall, modeling in the home environment was higher than in the community environment. Dad did not attend any community groups. Nanny averaged 1 model per minute playing a boardgame. After feedback was provided, she increased to 3 models per minute. She maintained a rate of 3 models per minute in the Library. All participants increased the number of models per minute when feedback was provided.

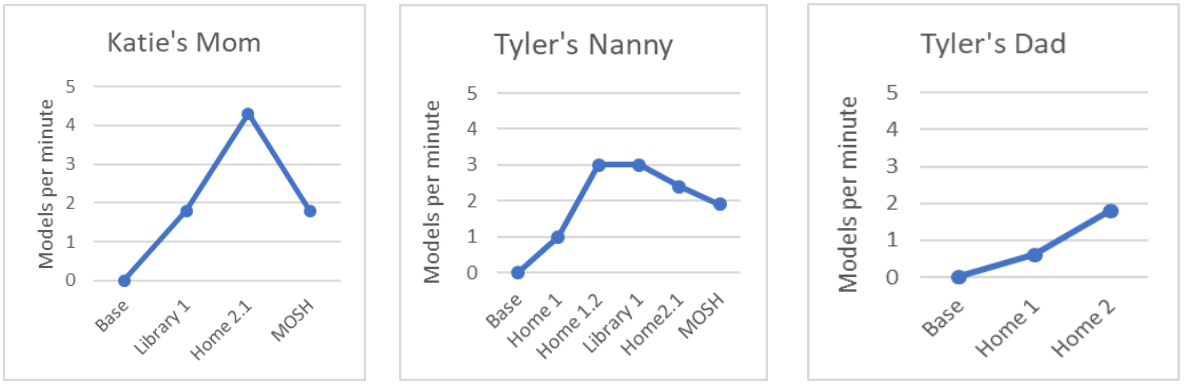

Figure 2. Number of models per minute in both community and home settings. Community settings included the Museum of Science and History (MOSH) and the public library.

Home and Community Practice

All participants rated using their child's AAC device "some more" or "a lot more" each week compared to "no more," a "little more," or "same as," the previous week in the home. Using the same scale participants rated community use of their child's device in the community as "no more" than the previous week. All the participants reported they had not taken the device in the community setting the previous week.

Modeling and Vocalization

Transcriptions of the recorded sessions allowed comparison of the caregiver's modeling and child vocalized output (see Figure 3). During session one, Nanny modeled 20% of her phrases during a boardgame. Tyler vocalized words that were modeled on the SGD 82% of the

time compared to 50% of vocalizations of unmodeled phrases. After Nanny was provided with feedback, she improved her modeling to 42%. When Nanny improved modeling, Tyler improved his vocal approximations. After feedback, 63% of Nanny's modeled words elicited clear vocalizations (spoken words) from Tyler. Unclear approximations that previously occurred without modeled words decreased to less than 1%. Tyler's verbal approximations following modeled SGD output were clearly articulated and understood by unfamiliar people. Vocalizations occurring with non-modeled phrases or questions consisted of initial sounds or prosody of syllables and were difficult to understand even by familiar people.

During session two, 18% of phrases were modeled by Nanny and 77% of these models evoked clear vocalizations. Similarly, 16% of unmodeled phrases or questions that yielded approximations were not understood.

Tyler

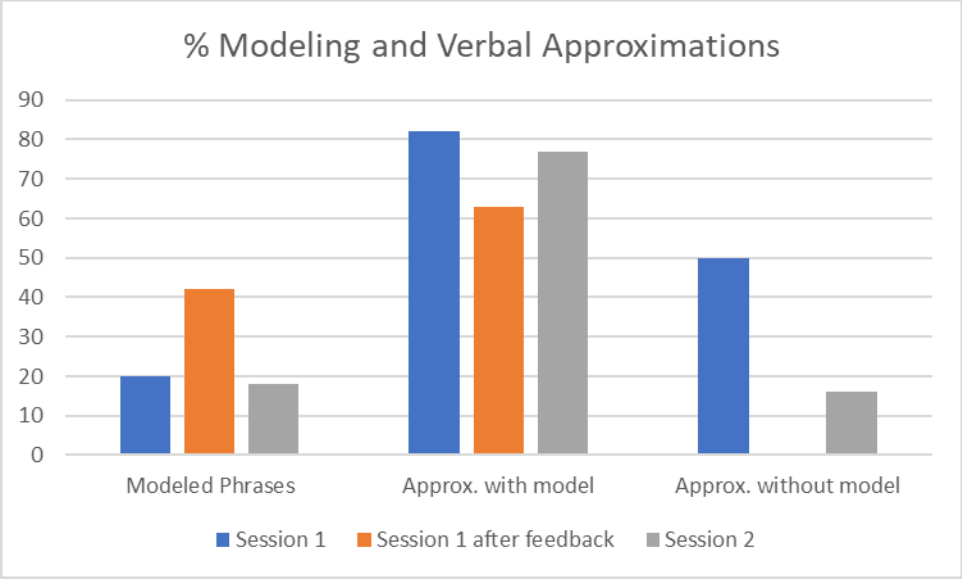

Figure 3. Percentage of Tyler's vocal approximations compared to percentage of modeling.

Table 3. Sample of Tyler's word approximations during session one.

Modeled	Nanny's Verbal Phrases	Vocalizations
Not modeled	Do you want to read or play in the sand?	Gu gu
Not modeled	What do you see?	Di di
Bird	It comes from a bird.	Bird
Not modeled	What is it?	*No vocalization*
Not modeled	What is that?	*No vocalization*
Butterfly	It's a butterfly.	Butterfly

During a home observation (session two), Katie's mom modeled 39% of her phrases. Forty-seven percent of her phrases were statements and the remaining phrases were questions. Katie used her AAC to respond to 15% of the questions without a prompt including immediate presence of a model prompt. Katie's responses were one word (62%) and two words (37%). Katie did not verbalize, she did laugh, squeal with excitement and protest at times. Nanny modeled 54% of phrases as statements and the remaining 43% were questions (see Figure 5).

Katie

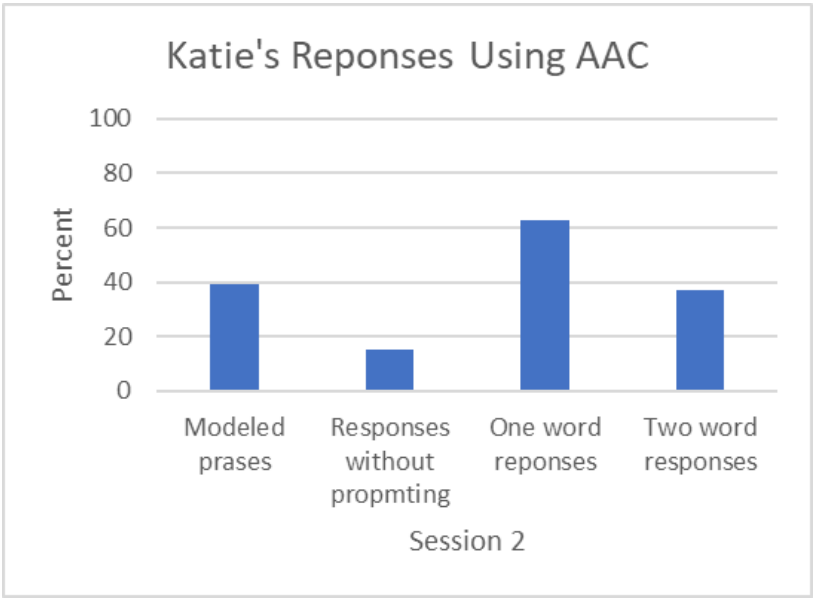

Figure 4. Percentage and type of Katie's AAC responses to modeled questions.

Modeled	Katie's mom's Verbal Phrases	AAC responses
Not modeled	Do you want to play with me yes or no?	(no)-
Yes	Here, well I want to play with you.	(yes)+
Not modeled	Which toy do you want?	(violet)-
Your turn	Here your turn.	*No response*
Not modeled	Make her sing?	*No response*
Your turn	There, your turn.	*No response*
Not modeled	Sit up.	*No response*
Not modeled	What is that?	(go)- (car)-
Not modeled	Let's do it together.	*No response*
Car	Car.	*No response*
Not modeled	Can you do car.	(car) +

Table 4. Sample of Katie's AAC responses during session two. Physical or gestural prompted words are indicated with a (+) sign. Unprompted words are represented by (–) sign.

When comparing samples from session two, Katie's mom modeled more. However, when comparing the types of phrases modeled, Nanny modeled more statements and Katie's mom modeled more questions. Interestingly, Katie responded independently using AAC to non-modeled questions whereas Tyler vocalized more clearly when modeled statements were provided.

Nanny and Katie's mom

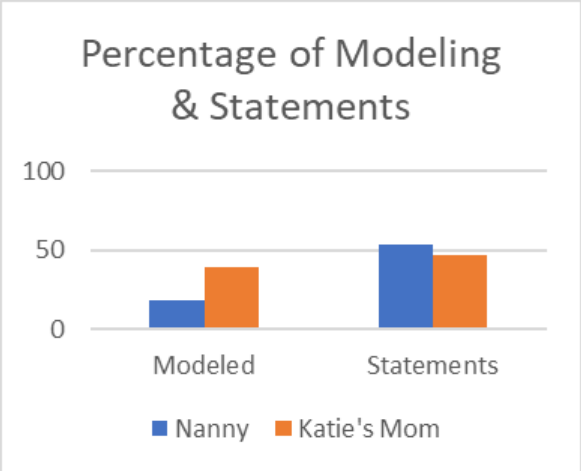

Figure 5. Percentage of modeled phrases and percentage of statements versus questions in chosen phrases from session two.

Facebook participation

Four participants accepted the Fb email invite to the online social-learning group. During week one, there was one learning module to complete, two encouragement posts and a Fb event invite to the community event at the library. Automated engagement statistics indicated all posts were seen by all participants. Dad read all posted learning modules but did not attend community events. The remaining three participants responded to the invite by selecting the "going" button. Tonya's mom did not attend the community outing. After two attempts to reach her by phone and failure to access the Fb group during week two, she was removed from the study. The Fb page received a total of 13 "likes", four comments and six event responses. Katie's mom participated the most with five "likes" and four comments. No other participants posted comments. All participants made at least one "like" including Tonya's mom.

Participants Post-intervention survey (n=3) rated the Fb page as "very good" (4/5) when all scores were averaged. When asked, participants "strongly agreed" (5/5) that they would attend an AAC social group if there was no instruction from a facilitator. Participants rated understanding of how to use modeling (4.3/5), and neither "agreed" or "disagreed" (3.6/5) the information was new or they had time for modeling in everyday life. All participants "strongly disagreed" that they would not use the intervention in the future (1/1 reverse scored), and would attend a follow-up or advanced workshop on the same subject (4.6/5).

Post-intervention Participation Feedback

Participants were asked about the quality of the program in a post-intervention survey. The results are displayed in table 4. Overall program quality was rated excellent.

Table 5. Quality of program.

Question	Mean (n=3)
I will recommend the program to others	5
The program was well paced within the allotted time	5
The material was presented in an organized manner	5
The amount of record keeping was reasonable	4.6
I have seen my child's communication improve	4
Home-School communication is necessary to be successful	5
How useful were videos	4.6
Rate the quality of the videos	4.6
Rate the Handouts	4.3
Rate the type of activities	4.6
Rate the coaching/assistance	4.6

Additionally, two open ended short answer questions asked participants to describe the best component and areas of program improvement. All participants stated a preference to increase the length of the study. One participant stated the weekly presentation of information was a good pace. One participant stated videos were the most helpful as well as being accountable to someone. One participant stated practicing in the community was the most beneficial.

Overall, this pilot study supports the use of community-based social-learning groups for caregiver's of AAC users. While a community-based social-learning group was effective in getting caregivers out in the community with a facilitator, it did not increase the independent use of their AAC in the community. Despite the lack of independent community use of AAC, participants did increase the use of AAC in the home, independent of a facilitator.

Chapter 5

Discussion, Limitations, and Recommendations

The purpose of this pilot study was three part. First, would participation in a social-learning group will increase the parent's frequency of modeling using their child's AAC device at home and second would it also increase use in the community. The final part was to examine

the feasibility of a community-based social-learning program. This section will discuss the results of the intervention as well as the implementation of a program.

Discussion

Self -efficacy and motivation. Interestingly, both Tyler's and Katie's devices were acquired privately. This could be attributed to motivation of the parents. Both children who are non-verbal, should have been provided communication devices by the public school but were not. Public schools are required by the Individuals with Disabilities Education Act (IDEA) to assess children for assistive technology. It was disappointing to see that all three of the participants in this study had delayed or no access to communication devices through the public-school system. Katie's mom was somewhat familiar with modeling but was not using it. She stated she was interested in the study to hold her accountable to modeling and specifically get practice using it in the community, which she does not do. This is consistent with studies that state watching others in similar situations assist with the perception of our own ability to perform a skill or task (Bandura, 1977; Gist & Mitchell, 1992)

Tonya's device was provided by the public school, but not until she was 11 years old. When Tonya's mom made the effort to start the study, she demonstrated motivation, however, she did not complete the remainder of the study after the first week. The researcher attempted to call her to offer individual support, but did not receive a return phone call after two attempts. Any attempt to explain her lack of participation would be speculation. It is possible that after she was added to the Fb group, she felt the information or the group would not provide the support she was looking for. It is unlikely that her full-time work schedule was a reason, as she stated her availability on the day and times of the study during the consent to participate. More concentrated recruitment efforts could help create a larger and more diverse group for caregivers. Consistent with other studies, lack of knowledge and or confidence is a barrier to supporting

families using AAC (Anderson et al., 2014; Bellomo, 2016; Sanders 2017; Stadkleive, 2017). Regardless of parent advocacy and motivation, AAC support should always be offered and provided.

Modeling strategy. The results demonstrate caregivers improved their modeling in both the home and community. However due to the limited number of replications in both home and community, stability of the increase is not established. For example, both Katie and Nanny increased their models per minute at home, but then, the rate decreased the following week in the community setting. Even at rate of two models per minute the caregiver was able to model above the minimum recommended 20 times per hour. Dad was out of town for work during most of the study and only demonstrated modeling in the home. While his performance increased in the home, given the current data, community performance for Dad cannot be predicted. In addition, data does not demonstrate whether or not the results can be sustained over an extended period of time without continuous support. Increasing the length of the study and including a maintenance phase should be considered in future studies. In addition, it would be worth investigating if correlations exist between the amount of AAC use to amount of AAC of the child.

Vocalizations. Since the aims of this study were focused on caregiver modeling, Tyler's vocalizations were an unexpected finding. During session two, it was noted that Tyler made some clear vocalizations. This prompted a review of the session one and two videos for comparison. When modeling focused on statements rather than questions, Tyler vocalized almost all of the words modeled as opposed to questions that were not modeled. The increase in clarity of Tyler's vocalizations was consistent with findings that have found AAC supports acquisition of natural speech (Bishop, 2017; Millar, Light, & Schlosser, 2006; Oommen, & McCarthy, 2015).

In contrast, Katie's use of AAC was in response to questions as opposed to statements. While Tyler did use his AAC to respond to some questions, AAC requires more effort than speech. Often, he preferred to attempt vocal approximations in response to questions. Again, because the children were not the focus of the study, it is difficult to draw conclusions from these differences. It is possible that one child has developed more receptive language skills and therefore has the ability to answer questions. However, Since Tyler's vocalizations are not easily understood, it is difficult to know whether is expressive vocalizations were answering questions.

Community modeling. Similar to Senner and Baud (2016), the modeling technique was successful in the natural environment without special preparation. However, instead of teaching educators in the classroom, this study teaches caregivers in the community. It is not surprising that the rate of modeling in the community decreased when compared to home or that it decreased from the library to the MOSH. Taking care of a child with DD requires a caregiver to juggle multiple tasks. Children with DD have a tendency to elope or require extra equipment to navigate in the community. The addition of a communication device adds to the equipment to handle. In Katie's situation, her communication device is a Windows tablet with minimal protection from damage, and no handle or strap to make carrying easier. Charging the device was also difficult because it was a computer versus a tablet. Tyler's device was an iPad in a rugged carrying case with both a shoulder strap and handle. Tyler's device was easy to charge on the go. Katie's mom quickly realized that to go in the community, she would need to look into different case options. Sitting and reading a book at the library is easier to model than walking around and talking about a museum exhibit because it is familiar, predictable and stationary. Many families have experience reading books to their children but few have experience taking children a museum. Katie's mom also said staring by others and slow speed of communication with the device were deterrents to venturing into the community alone which was consistent with other

research findings (Mc Naughton, et al., 2008). The challenges Katie's mom experienced suggests the value of community groups as a method for fostering AAC use in the community by building skill and confidence with coaching and feedback. The caregivers' ability to model during story book reading is consistent with other studies (Binger et al, 2010; Rosa-Lugo & Kent-Walsh, 2010; Senner & Baud, 2016).

Also consistent with other studies, using behavioral skills training was a successful strategy for teaching caregivers' modeling skills (Parsons et al., 2012; Senner & Baud, 2016). From a provider perspective, providing individual feedback in the community group setting was difficult. The participants were spread out during activities, sometimes in different rooms. Fleeting attention and repetitive behavior of the children made it difficult to provide feedback in the moment. When a caregiver modeled and the child listened, feedback would interrupt the momentum and seemed counterproductive. Therefore, feedback was limited to simple suggestions at the end of the session or in the home at an individual observation. Often, effects of the feedback were observed at the next session. In individual sessions, feedback was easier, less intrusive and easier to record. Facebook provided an effective way to provide group feedback and instruction for common errors witnessed during the activities. Despite the difficulty of providing individual feedback in a group, the activities were still effective. One of the aims of the study was to meet the increased demand and supplement services where there is a lack of providers. Community-based social-learning groups appear to be an option.

Providing community activities for parents to receive coaching and feedback across environments was intended to increase successful implementation of modeling as well as provide caregiver a support network. The online support was intended to be beneficial for caregivers who might otherwise be unable to attend educational or support groups in real-time (Bellomo, 2016;

Clifford & Minnes 2013). Participants utilized Fb as evidenced by their comments and "likes" on posts. Unfortunately, the small number of participants made Fb ineffective as a social support. Resources were provided to the participants to encourage them to join existing groups with a large member base to continue learning, interaction and online support after the study ended.

Modules. Online modules have been previously used by researchers as a method for disseminating modeling strategies to families (Bellomo, 2016). However, success of the intervention was based on the parents' knowledge of modeling and not the demonstration or use of the technique. Katie's mom is an example of a caregiver who had knowledge of the technique but did not use it until she participated in the study. In addition, once participants demonstrated the technique in real-life situations, they encountered challenges. For example, during activities, feedback often involved statements that were presented in the Fb posts such as "model key words, not sentences," "make comments, rather than always asking questions," "accept all forms of communication." This could may have resulted from distractions while learning the material or simply illustrate, multiple repetition's and practice are needed for communication partners to learn new skills (Kent-Walsh & McNaughton, 2005; Parsons et al., 2012).

Due to Facebook's accessibility, videos and material could easily be viewed while waiting in the school pick-up line, and be viewed multiple times for better understanding. Video clips were rated as one of the most valuable components of the program.

It is difficult to examine any long-term benefits of parent modeling in developing communication competence in the community. Caregivers successfully used AAC in the community during the study. Clearly, since none of the caregivers increased their independent use of AAC in the community, extended practice in this area may have improved this outcome. Modeling is just one skill in a dynamic and complex hierarchy of communication education for AAC users (Kent-Walsh & McNaughton, 2005; Ballin et al., 2009). Participants all agreed that

the length of the intervention should be longer. This supports that families both want and need more education about their child's AAC and desire education that includes use in the community (Crisp et al., 2014; Sanders, 2016). Even though modeling increased, the ratio of modeled phrases to unmodeled phrases was approximately 20:80. Extending the length of the intervention could produce a higher ratio of modeling of 80:20 as recommended by Dada and Alant (2008). Information provided during the three-week intervention was intended and rated by the participants as introductory. Despite this, participants were not able to apply all of the information. When the study ended the participants were given several resources for continuing their education about modeling including other online Fb groups and product support for their specific device. It is hoped that in the absence of another group, that more advanced materials will be sought out. All the participants stated they desired more education and advanced AAC strategies. Overall, the high rating of the group and quality of materials suggest, that community groups are wanted by families.

Program. The quality of the program was rated high by participants. Videos demonstrating modeling were necessary in order to provide demonstrations of modeling in multiple environments by multiple people. Videos are also necessary to allow asynchronous learning of skills. One of the challenges in creating this program was the availability of quality videos of modeling. Most modeling videos were found to include prompting or expectation of the AAC user to respond. Thus, videos were created specifically for this study to ensure that multiple exemplars were available in addition to the few found on Youtube.com.

Although Fb is feasible for delivery of information, ensuring a group large enough to provide parent to parent support, diversity and feedback is a challenge. Active ongoing recruitment would be necessary to build and sustain an interactive group. Although the study was designed to examine the effect of minimal intervention, it became clear that a moderator was

needed to stimulate active Fb engagement. The first week of the study, participants read the material and liked some of the content, but none posted comments or questions. During week two, additional questions and suggestions were posed to the participants through Fb posts. This elicited some comments. No participants took pictures or volunteered ideas they had tried unless solicitated. For example, Katie's mom started family reading time before bed. This allowed her spouse to read the book to the children while she modeled on Katie's device. She also enlisted Katie's little brother in peer modeling. Neither were shared on the Fb page. Nanny played a boardgame and talked about a TV program they were watching together, but also did not share on the Fb page. It is important that a moderator helps connect members to gain the greatest benefit from the group.

This social-learning group only focused on three components of modeling (a) motivation (b) core word (c) waiting and expanding. Training on prompting was not provided but would be a logical next module if the program was extended. Handouts were created for the distribution at the community events, but not given out because it seemed overwhelming. Instead, the information in the handouts was converted to Fb comments that were posted throughout the week. This helped encourage engagement in the Fb group.

Limitations

The first limitation of this study is use of a single subject design. While single subject designs (SSD) are frequently used in applied fields of education and behavioral studies the results lack generalizability outside the study (Hitchcock et al., 2010). The advantage for using a SSD in this study was the ability of the participant to serve as its own control. This is particularly beneficial in low incidence populations such as AAC users that would prevent well- powered randomization of participants. Due to the number of participants, generalization of the results of this study are limited.

The participation criteria for this study specified that the child must already have access to an AAC device. This limitation excludes several children who may require modeling intervention but have not been properly identified by providers for AAC. It is possible that children who already acquired AAC devices have parents who are stronger advocates. Therefore, the same parents may have been more motivated to volunteer for participation in a social-learning group exaggerating any potential benefits from the intervention.

Similarly, since the parents self-report home use of the device, the desire for success may create observer bias when recording data (Cooper et al., 2007). Using the data logging programs on each device demonstrated that the caregivers were using the devices at home as they reported. However, the capabilities of the data logging are limited. For example, both programs can show usage time of day, however, the RL program cannot distinguish between caregiver modeling verses user activation. Snap + Core data logging only showed most frequently used words but the modeling feature can be turned on and off to distinguish between modeling and user. For both users, it could be assumed that high usage times were when modeling occurred as usage patterns throughout the remaining times of days were much lower.

Another limitation of this study was the lack of experimental control for confounding variables that are present when research is conducted in the natural environment (Senner & Baud, 2017). One of the unique features of this study was to identifying effective methods of increasing AAC use in the community. Each week of the study was conducted with a different activity. Even in the home environment each activity varied based on the creativity of the caregiver or the mood and willingness of the child to participate.

Because the study utilized social media for the delivery of learning material, the researcher could not control the environment in which the participant accessed the learning

material. Consequently, the study included a social media component. Families without the means to access social media may not have had equitable access to this form of intervention.

Time of year could have been a barrier to caregivers' participation. Families have more time in their schedules during the summer. In the fall, children are going back to the school leaving little time for extra activities. The school district suggested recruiting at the end of the school year if the study was repeated. While the school district expressed interest in the study and distributed recruitment flyers, participants reported public schools need to take more active rolls in fostering AAC use. Beginning community groups and access to AAC in early intervention and preschool could make a significant impact on independence.

Conclusion

This study is unique and adds to the current knowledge base because it measured use of modeling technique after online instruction, in a nurse-lead community activity. Using Fb as a way to provide information about modeling was proven to be feasible for families of AAC users. In addition, families can be successful in using AAC in the community when coaching and feedback support is provided. Caregivers want more community opportunities to use AAC with their children and require multiple exemplars. Interventions should include written instructions, video demonstration and community activities for more than three weeks.

Future Recommendations

Because caregivers face more challenges with modeling in the community than at home, consideration should be given to prepare specific directives for caregivers to practice in the community. When using Fb groups as a social-learning tool, moderators should provide frequent posts that encourage participants to respond and practice skills.

During the recruitment process, several private behavioral schools reported having no students using SGD. This suggests more interdisciplinary collaboration is necessary for non-

verbal children. A few private speech therapists stated they had a younger population using devices. This was encouraging since the earlier students are provided speech devices the better their chances to have communication competency. Despite this, nurses should partner with school to take a more active role in developing communication partners for AAC users. This can be accomplished by including caregivers in community-based instruction.

In summary, future research should focus on both long-term, community-based, AAC interventions. Identifying the types of community activities that are best suited for fostering AAC skills should also be evaluated. In addition, motivating factors as well as barriers for caregiver participation in and the AAC user's communication plan should also be explored. Community programs are of critical importance in supporting the independence of this growing non-verbal population. If the programs are not socially significant, they are useless.

References

American Association of Colleges of Nursing. (2006). The essentials of doctoral education for advanced practice nursing. Washington, DC: Author.

American Speech-Language-Hearing Association. (1982). *Language* [Relevant Paper]. Available from www.asha.org/policy.

American Speech-Language-Hearing Association. (2018). Definition of communication and appropriate targets. Retrieved from: https://www.asha.org/NJC/Definition-of-Communication-and-Appropriate-Targets/

American Speech-Language-Hearing Association (2018). Augmentative and alternative communication (AAC). Retrieved from: https://www.asha.org/public/speech/disorders/AAC/#types

Americans With Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 328 (1990).

Anderson, K. L., Balandin, S., Stancliffe, R. J., & Layfield, C. (2014). Parents' perspectives on tele-AAC support for families with a new speech generating device: Results from an Australian pilot study. *Perspectives on Telepractice*, *4*(2), 39–70. https://doi.org/10.1002/pro.2529

Andzik, N. R., Chung, Y.-C., & Kranak, M. P. (2016). Communication opportunities for elementary school students who use augmentative and alternative communication. *Augmentative and Alternative Communication*, *32*(4), 272–281. https://doi.org/10.1080/07434618.2016.1241299

Andzik, N. R., Schaefer, J. M., Nichols, R. T., & Chung, Y. C. (2018). National survey describing and quantifying students with communication needs. *Developmental Neurorehabilitation*, *21*(1), 40–47. https://doi.org/10.1080/17518423.2017.1339133

Assistiveware (2019). Start Modeling. Retrieved from: https://www.assistiveware.com/learn-aac/start-modeling

Baio, J., Wiggins, L., Christensen, D. L., Maenner, M. J., Daniels, J., Warren, Z., & ...Pettygrove, S. (2018). Prevalence of autism spectrum disorder among children aged 8 years – Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014. *MMWR Surveillance Summaries*, *67*(6), 1-23. *Neurorehabilitation*, *21*(1), 40–47. https://doi.org/10.1080/17518423.2017.1339133

Balasubramanian, N., Shetty, A. P., TS, S. R., & Mani. (2017). Power analysis computed to determine sample size for an evaluative study of video assisted teaching module (VATM) on home care of schizophrenic patients developed for primary caregivers. *International Journal of Nursing Education*, *9*(2), 163–166. https://doi-org.proxy-clarion.klnpa.org/10.5958/0974-9357.2017.00056.3

Ballin, L., Balandin, S., Togher, L., & Stancliffe, R. J. (2009). Learning to use augmentative and alternative communication (AAC): Is there a mentoring role for adults experienced in using AAC? *Journal of Intellectual and Developmental Disability*, *34*(1), 89–91. https://doi.org/10.1080/13668250802676038

Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-Efficacy Beliefs of Adolescents*, 307–337.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psych Rev*, *84*(2), 191–215.

Barbosa, R. T. de A., de Oliveira, A. S. B., de Lima Antão, J. Y. F., Crocetta, T. B., Guarnieri, R., Antunes, T. P. C., … de Abreu, L. C. (2018). Augmentative and alternative communication in children with Down's syndrome: a systematic review. *BMC Pediatrics*, *18*(1), 160. https://doi.org/10.1186/s12887-018-1144-5

Beck, A. R., Stoner, J. B., & Dennis, M. L. (2009). An investigation of aided language stimulation: Does it increase AAC use with adults with developmental disabilities and complex communication needs? *AAC: Augmentative and Alternative Communication*, *25*(1), 42–54. https://doi.org/10.1080/07434610802131059

Bellomo, N., (2016). Increasing the augmentative and alternative communication knowledge and self- efficacy of parents of children with autism spectrum disorders: Using multimedia training materials. An Applied Dissertation (Unpublished dissertation). Nova Southeastern University, Fort Lauderdale, Florida.

Binger, C., Kent-Walsh, J., Ewing, C., & Taylor, S. (2010). Teaching educational assistants to facilitate the multisymbol message productions of young students who require augmentative and alternative communication. *American Journal of Speech-Language Pathology*, *19*(2), 108–120. https://doi.org/10.1044/1058-0360(2009/09-0015)

Binger, C., Kent-Walsh, J., Berens, J., Del Campo, S., & Rivera, D. (2008). Teaching latino parents to support the multi-symbol message productions of their children who require AAC. *AAC: Augmentative and Alternative Communication*, *24*(4), 323–338. https://doi.org/10.1080/07434610802130978

Binger C, & Light J. (2007). The effect of aided AAC modeling on the expression of multi-symbol messages by preschoolers who use AAC [corrected] [published erratum appears in AAC AUGMENT ALTERN COMMUN 2007 Jun;23(2):188-9]. *AAC: Augmentative & Alternative Communication*, *23*(1), 30–43.

Bishop, S. K., "Increasing Novel Vocalizations for Individuals with ASD Using a Voice Output Communication Aide" (2017). Master's Theses. 294. https://aquila.usm.edu/masters_theses/294

.

Blake Huer, M., & Threats, T. T. (2016). Shared responsibilities for full participation in society: planning further integration of the ICF into AAC. *Perspectives of the ASHA Special Interest Groups*, *1*(12), 83–93.

Boyle CA, Boulet S, Schieve LA, Cohen RA, Blumberg SJ, Yeargin-Allsop M, et al. Trends in the prevalence of developmental disabilities in US children, 1997–2008. *Pediatrics*. 2011; 127(6):1034–1042. 10.1542/peds.2010-2989

Brady, N. C., Bruce, S., Goldman, A., Erickson, K., Mineo, B., Ogletree, B. T., Paul, D., Romski, M., Sevcik, R., Siegel, E., Schoonover, J., Snell, M., Sylvester, L., & Wilkinson, K. (2016). Communication services and supports for individuals with severe disabilities: Guidance for assessment and intervention. *American Journal on Intellectual and Developmental Disabilities*, 121(2), 121-138.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development. *Developmental Psychology*, *22*(6), 723–742.

Buescher, A. S., Cidav, Z., Knapp, M., & Mandell, D. S. (2014). Costs of autism spectrum disorders in the United Kingdom and the United States. *JAMA Pediatrics*, *168*(8), 721-728. Doi:10.1001/jamapediatrics.2014.210

Cockerill, H., Elbourne, D., Allen, E., Scrutton, D., Will, E., McNee, A., … Baird, G. (2014). Speech, communication and use of augmentative communication in young people with cerebral palsy: The SH&PE population study. *Child: Care, Health and Development*, *40*(2), 149–157. https://doi.org/10.1111/cch.12066

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, *41*(5), 545–547. https://doi.org/10.1188/14.ONF.545-547

Castillo-Montoya, M. (2016). The qualitative report preparing for interview research: The interview protocol refinement framework. *The Qualitative Report*, *21*(1), 811–831. Retrieved from: http://nsuworks.nova.edu/cgi/viewcontent.cgi?article=2337&context=tqr

Christensen, D., Van Naarden Braun, K., Doernberg, N. S., Maenner, M. J., Arneson, C. L., Durkin, M. S., … Yeargin, A. M. (2014). Prevalence of cerebral palsy, co-occurring autism spectrum disorders, and motor functioning – Autism and Developmental Disabilities Monitoring Network, USA, 2008. *Developmental Medicine & Child Neurology*, *56*(1), 59–65. https://doi.org/10.1111/dmcn.12268

Chung, Y.-C., & Carter, E. W. (2013). Promoting peer interactions in inclusive classrooms for students who use speech-generating devices. *Research and Practice for Persons with Severe Disabilities*, *38*(2), 94–109. https://doi.org/10.2511/027494813807714492

Clifford, T., & Minnes, P. (2013). Logging on: Evaluating an online support group for parents of children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *43*(7), 1662–1675. https://doi.org/10.1007/s10803-012-1714-6

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Columbus, OH: Merrill Publishing Co.

Crisp, C., Draucker, C. B., & Ellett, M. L. C. (2014). Barriers and facilitators to children's use of speech-generating devices: A descriptive qualitative study of mothers' perspectives. *Journal for Specialists in Pediatric Nursing*, *19*(3), 229–237. https://doi.org/10.1111/jspn.12074

Dada, S., & Alant, E. (2009). The effect of aided language stimulation on vocabulary acquisition in children with little or no functional speech. *American Journal of Speech-Language Pathology*, *18*(1), 50–64. https://doi.org/10.1044/1058-0360(2008/07-0018)

Davis, M. A. C., Spriggs, A., Rodgers, A., & Campbell, J. (2018). The effects of a peer-delivered social skills intervention for adults with comorbid Down syndrome and autism spectrum

disorder. *Journal of Autism & Developmental Disorders*, *48*(6), 1869–1885. https://doi.org/10.1007/s10803-017-3437-1

Drager, K. D. R., Postal, V. J., Carrolus, L., Castellano, M., & Al, E. (2006). The effect of aided language modeling on symbol comprehension and production in 2 preschoolers with autism. *American Journal of Speech -Language Pathology*, *15*(2), 112–125. https://doi.org/10.1044/1050360(2006/012)

Fraenkel, P. (2006). Engaging families as experts: Collaborative family program development. *Family Process*, *45*(2), 237–257. https://doi.org/10.1111/j.1545-5300.2006.00093.x

Fragale, C., Rojeski, L., O'Reilly, M., & Gevarter, C. (2016). Evaluation of functional communication training as a satiation procedure to reduce challenging behavior in instructional environments for children with autism. *International Journal of Developmental Disabilities*, *62*(3), 139–146. https://doi.org/10.1080/20473869.2016.1183957

Fusch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *The Qualitative Report*, *20*(9), 1408–1416. https://doi.org/1, 1408-141.

Gist, M. E., & Mitchell, T. B. (1992). Self-Efficacy: A theoretical analysis of its determinants and malleability. *Academy of Management Review*, *17*(2), 183–211. https://doi.org/10.5465/AMR.1992.4279530

Granlund, M., Björck-Åkesson, E., Wilder, J., & Ylvén, R. (2008). AAC interventions for children in a family environment: Implementing evidence in practice. *AAC: Augmentative and Alternative Communication*, *24*(3), 207–219. https://doi.org/10.1080/08990220802387935

Hall, H., & Graff, J. (2010). Parenting challenges in families of children with autism: A Pilot Study. *Issues in Comprehensive Pediatric Nursing*, *33*(4), 187-204. Doi:10.3109/01460862.2010.528644

Harstad, E. B., Fogler, J., & Barbaresi, W. J. (2015). Comparing diagnostic outcomes of autism spectrum disorder using DSM – IV – TR and DSM – 5 Criteria, 1437–1450. https://doi.org/10.1007/s10803-014-2306-4

Hitchcock, J. H., Nastasi, B. K., & Summerville, M. (2010). Single-Case designs and qualitative methods: Applying a mixed methods research perspective. *Mid-Western Educational Researcher*, *23*(2), 49–58.

Hughes, C., Rung, L. L., Wehmeyer, M. L., Agran, M., Copeland, S. R., & Hwang, B. (2000). Self-Prompted communication book use to increase social interaction among high school students. *Research and Practice for Persons with Severe Disabilities*, *25*(3), 153–166. https://doi.org/10.2511/rpsd.25.3.153

Johnson, J. M., Inglebret, E., Jones, C., & Ray, J. (2006). Perspectives of speech language pathologists regarding success versus abandonment of AAC. *AAC: Augmentative and Alternative Communication*, *22*(2), 85–99. https://doi.org/10.1080/07434610500483588

Johnston, J. M., & Pennypacker, H. S. (2008) Strategies and tactics of behavioral research, Third Edition New York: Routledge.

Kaiser, A. P., & Roberts, M. Y. (2013). Parents as communication partners: An evidence-based strategy for improving parent support for language and communication in everyday settings. *Perspectives on Language Learning and Education*, *20*(3), 96. https://doi.org/10.1044/lle20.3.96

Kasari, C., Kaiser, A., Goods, K., Nietfeld, J., Mathy, P., Landa, R., Murphy, S. & Almirall, D., (2014). Communication interventions for minimally verbal children with autism: A

sequential multiple assignment randomized trial. *Journal of American Academy of Child and Adolescent Psychiatry,* 53(6), 635-645. http://dx.doi.org/10.1016/j-jaac.2014.01.019

Kent-Walsh, J., Murza, K., Malani, M. & Binger, C. (2015). Effects of communication partner instruction on the communication of individuals using AAC: A meta-analysis. *Augmentative and Alternative Communication,* (31) 4, 271-284. DOI:10.3109/07434618.2015.1052153

Kent-Walsh, J. Binger, C. & Buchanan, C. (2015). Teaching children who use augmentative and alternative communication to ask inverted yes/no questions using aided modeling. *American Journal of Speech-Language Pathology,* (24) 222-236.

Kent-Walsh, J.K., Binger, C., and Hasham, Z. (2010). Effects of parent instruction on the symbolic communication of children using augmentative and alternative communication during storybook reading. *Communication Disorders Quarterly*, *30*(1), 49–61. https://doi.org/10.1177/1525740108320353

Klein, L. A., Houlihan, D., Vincent, J. L., & Panahon, C. J. (2017). Best practices in utilizing the changing criterion design. *Behavior Analysis in Practice*, *10*(1), 52–61. https://doi.org/10.1007/s40617-014-0036-x

Light, J. (1989). Toward a definition of communicative competence for individuals using augmentative and alternative communication systems Toward a Definition of Communicative Competence for Individuals Using Augmentative and Alternative Communication Systems, *4618*. https://doi.org/10.1080/07434618912331275126

Light, J., & McNaughton, D. (2012). Supporting the communication, language, and literacy development of children with complex communication needs: State of the science and future research priorities. *Assistive Technology*, *24*(1), 34–44. https://doi.org/10.1080/10400435.2011.648717

Light, J., & McNaughton, D. (2014). Communicative competence for individuals who require augmentative and alternative communication: A new definition for a new era of communication? *30*(January), 1–18. https://doi.org/10.3109/07434618.2014.885080

Light, J., & McNaughton, D. (2015). Designing AAC research and intervention to improve outcomes for individuals with complex communication needs. *AAC: Augmentative and Alternative Communication*, *31*(2), 85–96. https://doi.org/10.3109/07434618.2015.1036458

Lilienfeld, M., & Alant, E. (2005). The social interaction of an adolescent who uses AAC: The evaluation of a peer-training program. *AAC: Augmentative and Alternative Communication*, *21*(4), 278–294. https://doi.org/10.1080/07434610500103467

Logan, K., Iacono, T., & Trembath, D. (2017). A systematic review of research into aided AAC to increase social-communication functions in children with autism spectrum disorder. *Augmentative and Alternative Communication*, *33*(1), 51–64. https://doi.org/10.1080/07434618.2016.1267795

Long, B., (2018). *Autism Basics.* Division of Birth Defects, National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention. Retrieved 7/14/18 http://www.dcc-cde.ca.gov/af/afbasic.htm

Lynch, Y., McCleary, M., & Smith, M. (2018). Instructional strategies used in direct AAC interventions with children to support graphic symbol learning: A systematic review. *Child Language Teaching and Therapy*, *34*(1), 23–36. https://doi.org/10.1177/0265659018755524

Mandak, K., & Light, J. (2018). Family-centered services for children with ASD and limited speech: The experiences of parents and speech-language pathologists. *Journal of Autism and Developmental Disorders*, *48*(4), 1311–1324. https://doi.org/10.1007/s10803-017-3241-y

Mandak, K., O'Neill, T., Light, J., & Fosco, G. M. (2017). Bridging the gap from values to actions: a family systems framework for family- centered AAC services. *Augmentative and Alternative Communication*, *33*(1), 32–41. https://doi.org/10.1080/07434618.2016.1271453

McDougall, D., Hawkins, J., Brady, M., & Jenkins, A. (2006). Recent innovations in the changing criterion design. *The Journal of Special Education*, *40*(1), 2–15. https://doi.org/10.1177/00224669060400010101

McNaughton, D., Rackensperger, T., Benedek-Wood, E., Krezman, C., Williams, M., & Light, J. (2008). "A child needs to be given a chance to succeed": Parents of individuals who use AAC describe the benefits and challenges of learning AAC technologies. *AAC: Augmentative and Alternative Communication*, *24*(1), 43–55. https://doi.org/10.1080/07434610701421007

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*(2), 248–264. https://doi.org/10.1044/1092-4388(2006/021)

Miltenberger, R. G., & Roberts, J. A. (1999). Training and generalization of sexual abuse prevention skills for women with mental retardation. *Journal of Applied Behavior Analysis*, *32*(3), 385. https://doi-org.proxy-clarion.klnpa.org/10.1901/jaba.1999.32-385

O' Neill, T., Light, J., & Pope, L. (2017). Effects of interventions that include aided augmentative and alternative communication of individuals with complex communication needs: A meta-analysis. *Journal of Speech Language and Hearing Research*, July 2018 (61), 1743–1765. Doi:10.1044/2018_JSLHR-L-17-0132

Oommen, E. R., & McCarthy, J. W. (2015). Simultaneous natural speech and AAC interventions for children with childhood apraxia of speech: Lessons from a speech-language pathologist focus group. *AAC: Augmentative & Alternative Communication*, *31*(1), 63–76. https://doi.org/10.3109/07434618.2014.1001520

Parsons, M. B., Rollyson, J. H., & Reid, D. H. (2012). Evidence-based staff training: a guide for practitioners. *Behavior analysis in practice*, *5*(2), 2–11. Doi:10.1007/BF03391819

Prentke Romich Company (2014). RealizeLanguage [Computer Application]. Retrieved from: https://realizelanguage.com/info/about

Prizant B. M, Wetherby A. M, Rubin E., & Laurent A. C. (2003). The SCERTS Model: a transactional, family-centered approach to enhancing communication and socioemotional abilities of children with autism and spectrum disorder...Social Communication, Emotional Regulation, and Transactional Support. *Infants & Young Children: An Interdisciplinary Journal of Early Childhood Intervention*, *16*(4), 296–316 21p.

Romski, M., Sevcik, R. a, Adamson, L. B., Cheslock, M., Smith, A., Barker, R. M., & Bakeman, R. (2010). Randomized comparison of augmented and nonaugmented language interventions for toddlers with developmental delays and their parents. *Journal of Speech, Language, and Hearing Research*, *53*(April), 350–364. https://doi.org/10.1044/1092-4388(2009/08-0156)

Rosa-Lugo, L., I., & Kent-Walsh, J. (2008). Effects of parent instruction on communicative turns of Latino children using augmentative and alternative communication during storybook reading. *Communication Disorders Quarterly*, *30*(1), 49–61. https://doi.org/10.1177/1525740108320353

Sanders, H. (2017). Extension of school augmentative and alternative communication services to home: A national survey, (April). Retrieved from

https://kuscholarworks.ku.edu/bitstream/handle/1808/25826/Sanders_ku_0099M_15238_DATA_1.pdf?sequence=1&isAllowed=y

Senner, J., & Baud, M. (2016). Pre-Service training in AAC: Lessons from school staff instruction the need for pre-service training in AAC. *Perspectives of the ASHA Special Interest Groups*, *1*(Part 2), 24–31. Retrieved from http://pubs.asha.org/ss/rights_and_permissions.aspx

Senner, J. E., & Baud, M. R. (2017). The use of an eight-step instructional model to train school staff in partner-augmented input. *Communication Disorders Quarterly*, *38*(2), 89–95. https://doi.org/10.1177/1525740116651251

Sennott, S. C., Light, J. C., & McNaughton, D. (2016). AAC modeling intervention research review. *Research and Practice for Persons with Severe Disabilities*, *41*(2), 101–115. https://doi.org/10.1177/1540796916638822

Solomon-Rice, P. L., & Soto, G. (2014). Facilitating vocabulary in toddlers using AAC: A preliminary study comparing focused stimulation and augmented input. *Communication Disorders Quarterly*, *35*(4), 204–215. https://doi.org/10.1177/1525740114522856

Skinner, B.F. (1974). About behaviorism. New York: Knopt; [distributed by Random House].

Stadskleiv K. (2017). Experiences from a support group for families of preschool children in the expressive AAC user group. *Augmentative and Alternative Communication* (33) 1, 3-13. http://dx.doi.org/10.1080/07434618.2016.1276960

Steca, P., Bassi, M., Caprara, G. V., & Fave, A. D. (2011). Parents' self-efficacy beliefs and their children's psychosocial adaptation during adolescence. *Journal of Youth and Adolescence*, *40*(3), 320–331. https://doi.org/10.1007/s10964-010-9514-9

Squires M. E., & Tourangeau A., (2009). The missing data dilemma. *Canadian Journal of Cardiovascular Nursing*, *19*(4), 33–36.

Sylvia, M. L., & Terhaar, M. F. (2014). Clinical analytics and data management for the DNP. New York, NY: Springer.

Terry, A. (2015). Clinical research for the doctor of nursing practice (2nd ed.). Burlington, MA: Jones & Bartlett.

Tönsing, K. M., & Dada, S. (2016). Teachers' perceptions of implementation of aided AAC to support expressive communication in South African special schools: a pilot investigation. *AAC: Augmentative and Alternative Communication*, *32*(4), 282–304. https://doi.org/10.1080/07434618.2016.1246609

Topia, M., & Hocking, C. (2012). Enabling development and participation through early provision of Augmentative and Alternative Communication. *New Zealand Journal of Occupational Therapy*, *59*(1), 24–30.

Trottier, N., Kamp, L., & Mirenda, P. (2011). Effects of peer-mediated instruction to teach use of speech-generating devices to students with autism in social game routines. *AAC: Augmentative and Alternative Communication*, *27*(1), 26–39. https://doi.org/10.3109/07434618.2010.546810

Tudge, J. R. H., Payir, A., Merçon-Vargas, E., Cao, H., Liang, Y., Li, J., & O'Brien, L. (2016). Still misused after all these years? A reevaluation of the uses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory and Review*, *8*(4), 427–445. https://doi.org/10.1111/jftr.12165

U.S. Department of Health and Human Services (1999). Mental Health: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health.

Van Tongerloo, M. A. M. M., Van Wijngaarden, P. J. M., Van der Gaag, R. J., & Lagro-Janssen, A. L. M. (2015). Raising a child with an autism spectrum disorder: “If this were a partner relationship, I would have quit ages ago.” *Family Practice*, *32*(1), 88–93. https://doi.org/10.1093/fampra/cmu076

Wittkowski, A., Garrett, C., Calam, R., & Weisberg, D. (2017). Self-report measures of parental self-efficacy: A systematic review of the current literature. *Journal of Child and Family Studies*, *26*(11), 2960–2978. https://doi.org/10.1007/s10826-017-0830-5

World Health Organization. How to use the ICF: A practical manual for using the International Classification of Functioning, Disability and Health (ICF). Exposure draft for comment. October 2013. Geneva: WHO

Appendix A

Types of AAC

(a) No tech or unaided AAC refers to using one's own body to communicate. Examples of unaided AAC would include pointing or leading, American sign language, facial expressions or body language.
(b) Low technology or aided AAC refers to the use equipment. Examples of low technology AAC would include pen and paper, pointing to pictures or word typically on a static display board. Sometimes words or pictures are laminated and placed on a key ring to make them easily portable.
(c) High technology is also considered aided AAC. The equipment is more sophisticated then paper and pencil. Letters words or pictures are displayed on equipment such as an iPad. High technology devices may have speech generation activated by touching the word or picture.

American Speech-Language-Hearing Association (2018). Augmentative and Alternative Communication (AAC). Retrieved from: https://www.asha.org/public/speech/disorders/AAC/#types

Appendix B

Demographic Survey

Completion of the survey indicates your willingness to take part in this study and that you are at least 18 years old. If you have any additional questions about your rights as a research participant, you may call Lisa Barrett 904 994 0747. Please complete this survey to the best of your ability and return it to the researcher before leaving.

Participant Name _____

Age of parent ☐ 20-30 ☐ 30-40 ☐ 40-50

☐ 50-60 ☐ Over 60

What is your (Parent) highest level of education?

☐ some high school ☐ high school ☐ some college

☐ college graduate ☐ graduate school

Actual age of your child _____ years _____ months

Estimated mental age of your child _____ years

How many years has your child has this communication device?

☐ less than one ☐ 1 year ☐ 2 years

☐ 3 years ☐ Over 3 years

What type of communication device and software does your child use? _____

What is your child's diagnosis? _____

What grade is your child in? _____

What race or ethnicity do you and your family most identify with? _____

Did you receive training for using the device ☐yes ☐no

Do you currently participate in a Facebook support/resource forum? ☐yes ☐no

How often do you take or use your child's communication device in the community?

☐ Never ☐ Seldom ☐ Sometimes ☐ Usually ☐ Almost always

Describe briefly any type of training you had for your child's communication method.

Type or write answer here

Thank you! Please return this form to the researcher before leaving

Appendix C

Content Review by Experts

You have agreed to review the content for a proposed training module to teach parents of augmentative alternative communication users how to use modeling techniques to facilitate their child's communication skill development in the community setting. Modeling is also referred to in the literature as Aided Augmented Input and Aided Language Stimulation. Please read through the content outline and view the embedded videos. Then, rate the material using the scale below. Please mark the response that best represents how much you agree or disagree with each statement.

1. The training addressed key components of modeling strategies. *(Content)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

2. The material in the training is well organized. *(Design)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

3. Facebook will provide an online format that is easy for parents to access *(Pedagogy)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

4. The use of video clips will increase the parents' ability to implement modeling. *(Content)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

5. The information is current practice. *(Content)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

6. The video quality is sufficient to demonstrate real life use. *(Content)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

7. The 15 minutes to complete the material is sufficient *(Design)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

8. The community activities chosen for group meetings will provide sufficient modeling opportunities. *(Pedagogy)*
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

9. The program is applicable to all learning styles.
   - ☐ Strongly Agree
   - ☐ Agree
   - ☐ Neither Agree or Disagree
   - ☐ Disagree
   - ☐ Strongly Disagree

Comments/Recommendations:

_____
_____
_____
_____
_____
_____
_____
_____

Appendix D

Copywrite permission for use of AssistiveWare materials.

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AssistiveWare B.V.
Laurierstraat 183
1016 PL Amsterdam
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Permission Letter

Date: 14/01/2019

Dear Miss, Mister,

Hereby we grant you permission to copyright to use some website content for a doctoral degree At Clarion University.

Kind regards,

Martijn Leopold

AssistiveWare

Appendix E

Intervention Module Plan

AAC User/Communication Partner Plan

AAC Communication Partner outcomes

By the conclusion of the group, the communication partner will be able to:

1. Identify motivating activities to promote communication opportunities
2. Demonstrate effective modeling of communication using preferred method of AAC in two separate settings
   a. Home setting
   b. Community setting
3. List five "Do and Don't" of AAC communication.
4. Give examples of re-casting and expanding using language stages
5. Recognize the importance of "wait time"
6. Develop and evaluate self-goals as a Communication Partner

AAC User Outcomes

By the conclusion of the group, the AAC users will be able to:
(with or without assistance of communication partner depending on baseline competence)

1. Respond (physically, verbally or using AAC) to familiar people and motivating activities
2. Increase utilization of AAC at home and community setting
3. Access AAC communication to communicate with an additional communication partner (requesting, commenting, directing)
4. Utilize AAC communication to comment on the group activity
5. Express multiple word utterances (+1 greater than base line) using AAC

Communication Partner Goal	AAC User Goals	Weekly session Number	Method	Assessment of Learning
Facebook post: Identify motivating activities to promote communication opportunities (1)	Attend (physically, verbally or using AAC) to familiar people and motivating activities (1)	1	**Discussion** **Facebook post:** Brainstorm motivating activities the kids like to do. Explain no expectation for child to reciprocate Constant access to AAC, praise ALL communication **Session 1 hand out:** Becoming a communication partner **Post Document**: AssistiveWare Week post 1- What is modeling? **Video (to watch at home via closed Facebook group):** https://www.youtube.com/watch?v=NdaEabODlh8 I cook (:15) **https://youtu.be/**LKsxfedOOZY **The word "You" (4:06)** https://www.youtube.com/watch?v=UZSwwbhyExE&index=3&list=PLfn9UI5ZGNPzHK14pr-OOck0IR8KR4ZZq&t=80s (3:18) -Phillip Go, modeling go while brother reads https://www.youtube.com/watch?v=QmuBaL-xWfw (1:47) playing a game, put it in, Explain no expectation for child to reciprocate https://www.youtube.com/watch?v=qys640DKD0Q (8:04) No, David https://www.youtube.com/watch?v=VnDkdvIXObg (5:09) watch with your child, piranhas don't eat bananas Easy to model with reading. This is advanced, but you don't model every word. **Group Activity**: Library Review group purpose First 10-15min. shared reading activity caregiver-child No coaching or feedback Second 10 mins with if child behavior tolerates (sensory/ interest toys) Simple one-word modeling (wow, go, ball, down, again, more, turn, get etc.) any words on the home page.	Active Participation Weekly Number of views on video and Facebook group (secret-closed) login Data collection tool Parent data collection tool

Communication Partner Goal	AAC User Goals	Weekly session Number	Method	Assessment of Learning
List five "Do and Don't" of AAC communication. (don't expect a response) (4) Recognize the importance of "wait time" (6) Create exciting stories to share or talk about what you are doing, going to do or did (3)	Utilize AAC communication to comment on the group activity (4) Access AAC communication to communicate with an additional partner (requesting, commenting, directing) (3) Increase utilization of AAC at home and community setting (1)	2	**Discussion:** **Facebook Post:** How the week went, barriers, successes, Explain and demonstrate modeling. Brainstorm in the replies a morning and afternoon activity for modeling for their unique situation. What are they already communication non -verbally? **Session handout:** Modeling key words, tips **Post:** AssistiveWare What are core words? **Video**: Examples of modeling everyday situations https://www.youtube.com/watch?v=oE5qLy2LABk It is hot (:21) https://www.youtube.com/watch?v=xkX9aPFiFSY (:45) Halloween https://www.youtube.com/watch?v=UG5JeH2H_OY (2:36) Rachael, core vs. fringe https://www.youtube.com/watch?v=Nz1jVfQOXAE (1:46) Core words with a peer https://www.youtube.com/watch?v=VnDkdvIXObg (5:09) watch with your child, piranhas don't eat bananas go back and see she mostly models the core words Wednesday https://www.youtube.com/watch?v=kGFqjhKajdM&list=UUknkKg-D_7DldLeMXvsGpcg Cookies and make 2:13 https://www.youtube.com/watch?v=YcjTq6v6ZQg rollercoasters 2:26 **Group Activity: YMCA room** **First 10" Making mug cup cakes** **Begin coaching and feedback** Core words: more, on, get, want, it, that, go, see, pour, mix, stir, hot, put, in, out Fringe: tableware and ingredients	Active Participation Weekly Number of views on video and Facebook group (secret-closed) login Data collection tool Parent data collection tool

Communication Partner Goal	AAC User Goals	Weekly session Number	Method	Assessment of Learning
Give examples of re-casting and expanding using language stages (5) Demonstrate effective modeling of communication using preferred method of AAC in two separate settings (*Model*) Home setting Community setting (2) Develop and evaluate self-goals as a Communication Partner (*Coaching*) (7)	Express multiple word utterances (+1 greater than base line) using AAC	3	**Discussion:** How the week went, barriers, successes, Demonstrating with enthusiasm. Explain Expanding and expectant pause. Model Directing and talking as if you are the kid (use of "I" vs "you"). Model expectant pause by looking eagerly at child 45 secs after a request, direction or question **Session handout:** Post intervention survey **Post:** More Response strategies, expanding, recast waiting. **Video:** **https://www.youtube.com/watch?v=FE1BzN7ncl4** (5:34) prompting expanding, waiting https://www.youtube.com/watch?v=AV-q9TlpLSQ (3:00) Expanding **Group Activity:** MOSH. Let's do "this action" No requirement to use device. Phone follow-up Connect with other resources and meeting place if group wants to continue to meet on own.	Active Participation Weekly Number of views on video and Facebook group (secret-closed) login Data collection tool Parent data collection tool

Appendix F

Interobserver Agreement

Calculation of total and mean count-per-interval interobserver agreement (IOA) for frequency of modeling. While watching a video of a partner and AAC user modeling, the observers independently tally the number of times modeling behavior occurred in each video. Once event recording is complete, the smallest count divided by the larger count and multiplied by 100. This was done for total and individual intervals. (Cooper, Heron, & Heward, 2007). Observer 1 & 2, 2&3, and 3&1 were compared for IOA.

Video	Observer 1	Observer 2	Observer 3	Observer 1&3	Observer 2&1	Observer 2&3	Mean count per interval IOA
1							
2							
3							
4							
5							
6							
Mean							
Total Count Agreement					Mean count per interval IOA= Total count IOA=		

Appendix G

Data Collection Tool

Definitions:

1. Modeling: Occurs when a communication partner activates one or more key words in a spoken phrase on the child's SGD during an interaction with the child while speaking the words immediately before, during or after activation A production of a model begins when the communication partner is with in arms reach of the user and touches the device to generate word and ends with a pause following completion of the last audible or thought or sentence output regardless if the AAC user (child) walks away from the partner while modeling.). Individual words of a sentence are counted as one thought regardless of the length of pause in between navigation or words. Repeated words and phrase count as individual interactions when the partner uses the icon and not the message bar to activate the device.

2. Modeling Does Not Occur When: User touches the device but does not produce verbal output, or if the user touches the device for navigation purposes (such as back, clear or page forward). Individual words of a sentence are counted as one thought regardless of the length of pause in between navigation or words. Repeated words and phrase count as individual interactions.

Directions: Use the table below to record whether modeling was used during an interaction.

Partner Name: AAC user age and gender: Date of observation:

Observation Activity: Time of observation: Length of observation:

Time:	10 minutes pre- coaching and feedback	10 minutes pre- coaching and feedback
Modeling occurred		

Additional observations:

Appendix H

Caregiver Data Collection Tool

Sample: *Kelli Miller*
Date 11/23/18 Time: 6:10pm

Compared to last week how much more did you use your child's communication device to communicate with him/her at home (do not include time spent in the group activity)

No more A little more Same as Some more A lot more

Name: _____
Date _____ Time: _____

Compared to last week how much more did you use your child's communication device to communicate with him/her at home (do not include time spent in the group activity)

No more A little more Same as Some more A lot more

Compared to last week how much more did you use your child's communication device to communicate with him/her in the community (do not include time spent in the group activity)

No more A little more Same as Some more A lot more

Appendix I

Postintervention Participant Feedback

Thank you for you and your family for participating in this important study. We hope you have enjoyed this Communication support group and it has been beneficial to everyone involved. In order to provide the best service to more families in our area, please answer the questions below about your experience with this group.

	Strongly disagree				**Strongly agree**
1. I understand how to use modeling	1	2	3	4	5
2. This information was new to me	1	2	3	4	5
3. I will recommend this program to others	1	2	3	4	5
4. The program was well paced within the allotted time	1	2	3	4	5
5. I have time to use modeling in everyday life	1	2	3	4	5
6. The material was presented in an organized manner	1	2	3	4	5
7. I would not use this intervention in the future	1	2	3	4	5
8. I would be interested in attending a follow-up, more advanced workshop on this same subject	1	2	3	4	5
9. The amount of record keeping was reasonable	1	2	3	4	5
10. I have seen my child's communication improve	1	2	3	4	5
11. Home-School communication is necessary to be successful	1	2	3	4	5
12. I would attend an AAC social group if no teaching from a facilitator was provided	1	2	3	4	5

13. In your opinion, was this program: ❑ a. Introductory ❑ b. Intermediate ❑ c. Advanced

14. Please rate the following:

	Excellent	Very Good	Good	Fair	Poor
a. Facebook page	❑	❑	❑	❑	❑
b. Video usefulness					
c. Video quality	❑	❑	❑	❑	❑
d. Handouts	❑	❑	❑	❑	❑
e. Type of activities					
f. Coaching/assistance	❑	❑	❑	❑	❑

15. What did you most appreciate/enjoy/think was best about the program?

16. What can we do better next time?

Thank you!
Please return this form to the researcher before leaving