Training Educational Assistants to Facilitate Grammatical Development of Adolescents Who Use AAC

A Dissertation submitted
to the Graduate School
Valdosta State University

In partial fulfillment of requirements
For the degree of

DOCTOR OF SPEECH-LANGUAGE PATHOLOGY

in Speech-Language Pathology

In the Department of Communication Sciences and Disorders
of the Dewar College of Education and Human Services

November 2018

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ABSTRACT

In 2016, the American Speech-Language Hearing Association (ASHA) surveyed school-based speech-language pathologists (SLPs) and found that approximately 55% served students who used some form of augmentative and alternative communication (AAC) (ASHA Schools Survey). AAC offers the potential for individuals with complex communication needs (CCN) to enhance communication, improve academic achievement, and increase societal participation. Unfortunately, many students lack access to effective AAC interventions due to lack of practicing SLPs with experience in AAC (ASHA, 2010), as well as a lack of training for key stakeholders (e.g. parents, teachers, educational assistants). Costigan and Light (2010) noted that many clinicians and special education teachers receive little to no pre-service exposure to AAC. In many schools across America, educational assistants (EAs) may spend the most amount of time supporting students who use AAC, but receive the least amount of formal training (Kent-Walsh & Light, 2003).

While there is a growing body of research evidence that suggests that EAs can be trained to support the communication of young children with CCN, there is a notable gap with adolescent students (Binger, Kent-Walsh, Ewing, & Taylor, 2010; Douglas, Light, & McNaughton, 2012; Kent-Walsh, 2003). Therefore, the current investigation sought to expand the research base in the area of partner instruction to evaluate the viability with an adolescent population of AAC users. The current investigation utilized a single-subject, multiple-baseline design across three dyads to examine the effects of training EAs to modify their interaction patterns during a curriculum based reading activity with the adolescent AAC user that they support. More specifically, the EAs were taught to use the

Read-Ask-Answer-Prompt (RAAP!) interaction strategy (Binger et al., 2010) in order to facilitate their students' use of grammatical morphology.

Visual Analysis and effect size analyses indicated that the intervention was highly effective at increasing the EAs' use of the target strategy, as well as the students' correct production of grammatical morphemes. These findings suggest that an effective communication partner training program can lead to EA instructional gains, as well as communication gains for adolescents who use aided communication. The results, clinical and educational implications, and future directions are discussed.

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ACKNOWLEDGMENTS

The path towards this dissertation has been a long, circuitous journey. My ability to hold the vision and stay the path would not have been possible without those who have supported me throughout this process. I would like to express my sincere appreciation to my dissertation chair Dr. Matt Carter and my research committee member Dr. Jade Robinson. Dr. Carter, this research study would not have been possible without your time, guidance, and support. I appreciate your patience and willingness to offer advice through countless emails, phone calls, and conversations (many on a baseball field). Although I still do not prefer track changes, your humorous comments provided many needed laughs along the way. Dr. Robinson, your expertise in the field of AAC has been extremely valuable in guiding me through this project, as well as in my growth as a clinician. I will always remember your kind words and gentle encouragement that allowed me to believe in myself.

I would also like to recognize the remainder of my committee, Dr. Kelly Heckaman and Dr. Crystal Randolph for their ongoing support and contributions that led to the successful completion of this dissertation. Dr. Heckaman for her expertise in the field of special education, and Dr. Randolph for her expertise in single subject research. Thank you for both for your insights and recommendations during this project.

Finally, I wish to thank my family and friends for their love, support, and prayers that made this possible. Most importantly to my husband Lance, thank you for your unwavering faith in me throughout this journey. I am truly blessed to share this life with you and our four amazing children. To Hannah, Nick, Preston, and Cade: being your mom is my greatest reward and you are my greatest achievement. I love you all.

DEDICATION

This dissertation is dedicated to the memory of my mother, Cassie Goodson, who instilled in me a strong passion for individuals with disabilities. The greatest gift you have given me is your legacy of caring for and serving others. Words cannot describe the continued impact you have on my life.

"All that I am or ever hope to be, I owe to my mother." –Abraham Lincoln

Chapter I

INTRODUCTION

Approximately 12% of students receiving special education services in the United States have complex communication needs (CCN), meaning that speech alone does not meet their daily communication needs (Beukelman & Mirenda, 2005; Binger & Light, 2006). Moreover, this prevalence is expanding due to both an increased incidence of autism, as well as improved survival rates for children with other developmental disabilities (e.g. cerebral palsy, Down syndrome) (Light & McNaughton, 2012). For example, the Centers for Disease Control and Prevention (2014) reported that 1 in 59 children has been identified with autism spectrum disorder (ASD), with the prevalence increasing by approximately 6-15% each year. Augmentative and alternative communication (AAC) interventions offer the potential for these individuals with CCN to enhance communication, which is needed for all aspects of learning, socialization, and societal participation.

Developmentally, communication and emergent literacy skills begin to develop at birth. Oral language skills, which provide the foundation for literacy, are shaped by the situational, sociocultural, and communicative contexts that children are exposed to prior to entering school (Koppenhaver & Yoder, 1993; Teale & Sulzby, 1986; Vygotsky, 1978). However, many students with severe communication difficulties, who require AAC, enter school without a solid foundation on which to build the communication and literacy skills needed for academic and social success. According to the principles of naturalistic instruction, children learn to communicate by communicating, and children

need communication partners communicating within their zone of proximal development (ZPD) for language learning to occur. Language development occurs best in natural contexts that provide motivation for communication, as well as an opportunity for learning new forms and functions from a more advanced partner. Moreover, communication partners require systematic training to provide effective communication to support language development and communication growth in children who use aided communication (Kent-Walsh, Murza, Malani, & Binger, 2015; Kent-Walsh & McNaughton, 2005).

The challenge for professionals is to provide effective service delivery to individuals with CCN, especially those who may require AAC. Central to that challenge is finding time to develop and implement services based on recommended practices. One possible solution to expand service delivery is to include communication partners. A communication partner can be defined as anyone who communicates with a child who uses AAC. This can include parents, peers, siblings, teachers, and other professionals who interact with the child. According to the American Speech-Language Hearing Association's (ASHA) (2016) position statement on AAC service delivery, speech-language pathologists (SLP) should use evidence-based practices to evaluate the outcomes of AAC, particularly those related to increased life participation and enhanced quality of life. Moreover, ASHA recommends that SLPs possess the skill of "role release", which is the effective and appropriate use of communication partners to facilitate effective communication of individuals with CCN within the natural setting.

Despite national and state mandates to provide evidence based literacy instruction to all students, regardless of physical or developmental delays, 70-90% of children with CCN lag behind their same-age nondisabled peers (Koppenhaver, Hendrix, & Williams,

2007). The challenge is to provide AAC stakeholders with feasible, evidence based practices to increase the literacy and language skills of adolescents who use AAC, while remaining cognizant of the academic, social, and continuing language challenges faced by the student.

Adolescent students who use AAC may present a new set of challenges to their educational team, however, limited attainment of language and literacy skills should not lead to abandonment of these goals during adolescence (Smith, 2015). Research suggests that communication partner instruction programs, used in conjunction with AAC can help facilitate expressive communication in young children with CCN (Solomon-Rice & Soto, 2014). Given the special role that educational assistants (EAs) play in supporting students with CCN in the academic setting, communication partner training should be an ongoing focus of AAC intervention (Bingham, Spooner, & Browder, 2007; Binger et al., 2010, Bruno & Dribbon, 1998; Jonsson, Kristoffersson, Ferm, & Thunberg, 2011; Kent-Walsh, Binger, & Hasham, 2010).

Chapter II

LITERATURE REVIEW

This research study examined the effects of training educational assistants to facilitate language development for adolescents who use aided communication. The following areas of research were examined during the development of this research study: (a) communication and language development, (b) theoretical frameworks for language acquisition in AAC, (c) assessment of children with spoken language disorders, (d) assessment of children who require AAC, (e) language intervention approaches and strategies for children with spoken language disorders, (f) language interventions approaches and strategies for children who require AAC, and (g) instructional considerations for communication partners.

Communication and Language Development

Linguists and developmental psychologists have been debating the learning mechanisms for language acquisition for many years. The underlying questions (e.g. how do children learn to talk, what must they learn to become effective communicators) surrounding this debate guide how we facilitate language development in children and adolescents. The following is a review of language acquisition theories in their possible relation to individuals who require AAC.

Proponents of nativist theories argue that language input only triggers linguistic rules of grammar that are innate (Chomsky, 1986; Pinker, 1984). Under this framework, language acquisition is relatively automatic and is something that happens to the child as a result of linguistic input from the adult (Chomsky, 1986; Hockema & Smith, 2009).

Opposing theorists would argue that language development occurs because of experiences, which shape the way the brain analyzes and organizes information (Elmen et al., 1996; Plunkett, Karmiloff-Smith, Bates, Elman, & Johnson, 1997). Under this framework, language learning occurs as the child's predisposed learning mechanism interacts with input from linguistically advanced communication partners (Tomasello, 2003; Vygotsky, 1978). While the "nature" versus "nurture" argument will not likely be resolved, theorists can generally agree on two aspects of language acquisition: (a) the predictable course of language development, and (b) the influence of multiple determining factors.

For most children, language acquisition occurs rather fluidly as they interact with the world around them. It is both the quantity and quality of these linguistic interactions with communication partners that move a child from a prelinguistic state to intentional communication (Reichle, Beukelman, & Light, 2002). Infants begin to discriminate between speech and non-speech sounds within the first few weeks of life (Warren & Rogers-Warren, 1982). Prior to the expression of first words around the age of 12 months, children begin to develop multiple capacities that help to facilitate communication and language learning. Joint attention, intentionality, and turn-taking begin to develop at approximately 6 months of age (Lahey, 1988; Otto, 2010; Warren & Rogers-Warren, 1982). Moreover, children begin to understand cause-effect relationships between the ages of 10-12 months (Lahey, 1988). It is also during this early developmental period that children begin to understand the power of communication as they begin to use prelinguistic behaviors, such as gestures, to direct the actions of others and to make references to objects (Lahey, 1988). These precursors to language are developed during naturalistic interactions (e.g. play) with communication partners.

As first words begin to emerge around the one-year mark, children begin to use communication to greet people, protest, comment, obtain objects, and/or respond to others (Lahey, 1988). By the age of 18 months, lexical development is in full swing as children are exposed to approximately 4,000-6,000 words per day. Once an initial lexicon of approximately 50 words is established, usually by 24 months, children begin to combine words to produce short, two word utterances (Bochner & Jones, 2008; Rescorla, 1989). These early sentences (e.g. "want juice") are often missing elements of grammar (e.g. prepositions) and morphology (e.g. plural and tense markers) (Brown, 1973). However, as children move in to Brown's Stage II, between the ages of 27-30 months, they begin to use bound morphemes, such as the present progressive -ing (e.g. "he go*ing"*) and the regular plural -s (e.g. "my doll*s"*). Between the developmental ages of 31-34 months (Brown's Stage III), children exhibit the use of irregular past tense verbs (e.g. "him *fell* down") and the possessive 's (e.g. "boy*'s* car"). In the final stages (35-47+ months) of morphological development, children begin to produce regular past tense verbs (e.g. "she jump*ed*"), third person regular present tense verbs (e.g. "the dog *chews* it"), and third person irregular present tense verbs (e.g. "he *has"*) (Brown, 1973).

Several research studies have examined vocabulary use patterns in typical development (TD). The subsequent composite lists that were developed provide AAC practitioners with guidance on vocabulary selection for individuals who use aided communication. Core vocabulary is a small set of words that are frequently used across activities and environments (e.g. "go", "stop", "turn", "you"). Banajee, Dicarlo, and Stricklin (2003) conducted a study to examine the vocabulary patterns of toddlers during two naturally occurring classroom activities. The resulting language samples revealed

that the toddlers repeatedly used a set of nine core vocabulary words across activities. More recently, Boenisch and Soto (2015) observed the core vocabulary of TD school-age students who were monolingual English speakers, as well as the vocabulary of TD students who were English language learners (ELL). The vocabulary samples, which were obtained in a school setting, suggested no marked differences between the core vocabulary of native English speaking students and ELL students. Similar to prior research in the area of core vocabulary, 200 words used by the native speakers accounted for 80% of the vocabulary represented. Likewise, 200 words used by the ELL students accounted for 85% of the words in their language samples. This study provides additional evidence for the use of a core vocabulary system for students who use AAC, including students who learn English as a second language. Core vocabulary is representative of all parts of speech and can be used to teach various communicative functions (e.g. request, negation, commenting, asking questions).

The learning mechanism for grammatical knowledge is one of the most hotly debated theories of language acquisition. Research supporting empiricist based views suggest that linguistic input in the forms of recasts and expansions lead to an increase in semantic and grammatical knowledge (Saxton, 2005). Research has also demonstrated a positive link between maternal recasts and mean length of utterance (MLU), and other aspects of grammatical development in typically developing children (Nelson, Denninger, Bonvillian, Kaplan & Baker, 1984). It is also evident that the quantity and grammatical complexity of speech that children hear affects the rate of acquisition of grammatical knowledge (Gerken, 2007; Hoff, 2006; Vasilyeva, Waterfall, & Huttenlocher, 2008). This evidence suggests a strong relationship between the

environment and linguistic input from the communication partner in language development.

Overall, theorists agree that there are multiple intricately related variables that affect language acquisition and communication development. These variables include social, perceptual, cognitive, conceptual, and linguistic domains (Smith, 2015). Furthermore, a linguistically rich environment will provide a child with multiple opportunities for communication, which in turn will advance language development (Hoff, 2006). It is through these social communicative experiences that a child begins to develop a language model, which serves as the input for the language acquisition mechanism. However, children experience different communicative environments and receive varying levels of linguistic input and opportunities for communication. Additionally, researchers are still unclear of the role that production has on language development. These variances are likely to result in-group and individual differences that affect the rate and course of language development (Hoff, 2006).

Theoretical Framework for Language Acquisition in AAC

Most children will develop speech as their primary means of expressing basic wants and needs, sharing information, fulfilling social etiquette, and connecting socially with others (Light, 1997). However, many children with developmental disabilities such as Down syndrome, autism, and cerebral palsy will not acquire spoken language sufficiently to meet their daily communicative needs (Light & Drager, 2007). Individuals with severe communication disorders, who require AAC, may use nonsymbolic (e.g. gestures, vocalizations) and/or symbolic (objects, photographs, written words, symbols, written words, manual signs) means to enhance communication (Beukelman & Mirenda, 2005).

Aided Language Production

While there is a preponderance of research examining spoken language development of children (e.g. Brown, 1973), there is a paucity of research examining the course of language development for children who use aided communication. Central to this inquiry regarding language acquisition is the need to determine the impact that decreased production has on language learning. For example, communication partners of children who use oral speech are able to provide negative evidence in the form of recasts and expansions (Marcus, 1993) as they gauge the child's language level during conversation. For a child who is primarily nonverbal, or uses a majority of single word utterances to communicate using AAC, the communication partner may not be able to adequately assess the current language level, and may not be able to provide verbal scaffolding accordingly. According to Marcus (1993), individuals who do not speak cannot receive negative evidence that may be required to learn grammar.

Despite the provision of AAC, many children and adolescents with CCN demonstrate low rates of communication, use predominantly single symbols and simple clause structures, and exhibit word order changes, and errors in grammatical morphology (Binger & Light, 2008; Blockberger & Johnston, 2003; Light, Collier, & Parnes, 1985; Sutton & Morford, 1998). There are a number of unique challenges that impact language development for children with CCN including the child's inherent abilities and learning mechanisms (e.g. joint attention, memory), the linguistic input-output asymmetry in the communication environment (Blockberger & Sutton, 2003; Light, 1997; Smith & Grove, 2003; Sutton, Soto & Blockberger, 2002), decreased communication opportunities (Kent-

Walsh & McNaughton, 2005; Light, 2003), and limited partner responses (Botting, 2002).

Demands on Learning Mechanisms/Access Barriers

Many children with developmental disabilities have difficulty initiating and maintaining joint attention (Landry, 1995; Landry & Chapieski, 1990). Research suggests that these deficits may be a result of underlying cognitive, perceptual, and/or social weaknesses (Mundy, Sigman, & Kasari, 1989; Wetherby, Prizant, & Hutchinson, 1998). Aided communication may require increased joint attention, as the introduction of the AAC system extends the triadic frame of communication (i.e. adult, child, shared activity) to quadratic (i.e. adult, child, shared activity, AAC system) (Benigno, Bennett, McCarthy, & Smith, 2011; Smith, McCarthy, & Beningo, 2009), which places additional demands on the child's already vulnerable learning mechanisms related to attention and memory (Murray & Goldbart, 2009).

Working memory and attention demands. In regards to language development, working memory (WM) is instrumental in the acquisition of new vocabulary, as well as in other aspects of reasoning and comprehension (Baddeley, 2003; Edwards, Beckman, & Munson 2004; Gathercole & Baddeley, 1990). Working memory is the part of the memory system that is responsible for temporarily storing and processing information during cognitive tasks. To use aided communication, a child must: (a) rely on sustained attention in order to keep the planned message and individual words that make-up that message in their mind, (b) use selective attention to attend to the relevant symbol(s), while ignoring the irrelevant ones, (c) divide attention between the display, the communication partner, and the intended message, and (d) utilize working memory to keep the intended message in mind while coordinating the various visuospatial

demands, motor movements, and social aspects of communication (Thistle & Wilkinson, 2013). Thus, aided communication adds a visuospatial component to language production, which may place additional stress on already taxed conventional learning mechanisms.

Research on children with developmental disabilities, such as autism and Down syndrome (DS), revealed strengths and weaknesses on various memory and attention tasks (Goldstein, Johnson, & Minshew, 2001; Jarrold & Baddeley, 1997; Joseph, McGrath, Tager-Flusberg, 2005; Munir, Cornish, & Wilding, 2000). For example, children with autism performed higher on verbal WM tasks (e.g. digit span, Corsi span), than on visual WM tasks (e.g. visual search) (Joseph et al., 2005), whereas children with Down syndrome performed higher on visual WM tasks than verbal WM tasks (Jarrold & Baddely, 1997). Thus, individuals with autism who use aided communication may have a difficult time distinguishing the salient features of an object and may select a similar symbol on their AAC system (Thistle & Wilkinson, 2013). For example, a child may want to request an apple for a snack, but because an apple is red and similar in shape to a strawberry, they may inadvertently select the strawberry symbol. Clinicians can use this knowledge to provide children with autism additional time for visual processing.

During attention tasks, children with autism demonstrated increased performance during sustained attention tasks (Goldstein et al., 2001), whereas children with Down syndrome demonstrated slightly lower, but still intact ability during these same tasks (Munir et al, 2000). Both groups (autism and DS) demonstrated impaired ability on selective and divided attention tasks. This line of inquiry on attention and memory in children with developmental disabilities, should guide clinicians on selecting

appropriate AAC displays and interventions. Strategies to decrease attention and working memory demands should be provided to increase the language learning process.

Opportunity Barriers to Language Acquisition

In addition to the memory and joint attention resources needed for language learning in aided communication, children must also overcome the input-output asymmetry between the spoken language models they hear, and the visual, symbolic language they are expected to produce. This language modality inequality has been referred to as input-output asymmetry (Light, 1997; Smith & Grove, 2003). The impact of input-output asymmetry in AAC affects several aspects of language development, including lexical knowledge, semantics, morphology, and syntax. Lexicon refers to the vocabulary available for the child to use on the AAC system, whereas semantics refers to the available language concepts represented by the graphic symbol(s) (Binger & Light, 2008).

Furthermore, children who use AAC are less likely to have the opportunity to use expressive language as their communication partners typically dominate conversations (Light, 2003). These partner behaviors frequently lead to decreased initiation and response behaviors of the AAC users (Kent-Walsh & McNaughton, 2005). Children and adolescents with CCN may also be at risk for receiving less frequent exposure to the quantity and quality of linguistic input needed for communication and language development (Blackstone, 1999).

Contingent responsivity. In typical development, communication partners routinely provide scaffolding in the forms of recasts, or expansions that stimulate language growth. Social constructivists theorize that the child's

speech output leads to contingent responsivity of the communication partner, which in turn accelerates language learning (Saxton, 2005; Smith, 2015). In order for the communication partner to respond linguistically, the child must produce an incomplete, or immature form of language (e.g. "me cookie"). The communication partner is then able to judge the child's communicative intent, as well as their current language level. In response, the communication partner provides an immediate correction, or expansion to advance the child's language (e.g. "you want a cookie"). A recast or expansion maintains the meaning behind the child's utterance and is provided without the expectation of the child repeating the corrected adult model.

Language learners who use aided communication may not fully benefit from communication partner responsivity for several reasons: (a) rarely initiate communication which provides negative evidence to the communication partner, (b) produce short 1-2 word productions, (c) use symbol displays that lack vocabulary to express spontaneous novel utterances, (d) have symbol displays that lack vocabulary to represent various grammatical categories, and/or (e) lack familiarity with a symbol or symbol location (Reichle et al., 2002). These factors can lead to ineffective communication between the child and his/her communication partners. Furthermore, the lack of initiations and/or language productions makes it difficult for the partner to gauge the language level of the child, specifically in the areas of syntax and morphology. Symbolic language acquisition, particularly in the area of morphosyntax, may then require additional support. A systematic review of communication partner instruction (Shire and Jones, 2015) suggests that a language modeling, coupled with explicit instruction may be the most effective and efficient method of increasing

language skills in the domains of syntax and morphology. Additionally, adolescent language learners who have experienced this ineffective style of communication for a longer period, may require a more intense intervention to increase overall linguistic complexity and language use.

Creating an Alternate Path for Language Learning in AAC

According to the emergentist theory for language acquisition, language development is a result of links between domain specific language and domain general processes of body, brain, and social situations (MacWhinney, 2001). Any weaknesses in general processes of acoustical perception (the body), working memory (cognition), morphological constructions (language), and perspective taking (pragmatics), must be overcome by the creation of a distinct alternate learning path (MacWhinney, 2001). Many children and adolescents with CCN exhibit delays in cognition, speech perception, attention, and memory. Proponents of the emergentist theory would argue that communication partners must provide explicit, structured language contexts for language learning to occur, thus creating an alternate path that may reduce demands of aided communication on already stressed learning mechanisms (von Tetzchner & Groove, 2003).

Overall, theorists remain unsure of the impact that language production has on language acquisition. While some theorists suggest that grammatical language acquisition would not be hindered by decreased expressive output (Crain & Fodor, 1993), others provide an account for the influence of expressive production on language learning (Bruner, 1983; Ninio & Snow, 1988). These vast differences may be a result of the heterogeneity of the population who uses AAC. Thus, clinicians should take into account each client's cognition, memory and attention skills, language learning

environment, social experiences, and language skills to determine possible influences on language acquisition.

Assessment of Children with Spoken Language Disorders

A spoken language disorder (SLD) may be defined in terms of impaired comprehension and/or impaired production of language across any aspect of language including, form (phonology, morphology, syntax), content (semantics), and/or use (pragmatics). Traditionally, language disorders are classified as either expressive language disorders, indicating deficits in language use, or receptive language disorders, indicating deficits in comprehension. A child may also present with a mixed receptive and expressive language disorder when both comprehension and use are impaired. While language disorders can present as a primary disability, they can also co-occur with developmental disabilities such as autism spectrum disorders (ASD), intellectual disabilities (ID), cerebral palsy (CP), and Down syndrome (DS). SLPs play an important role in the assessment, diagnosis, and treatment of spoken language disorders (American Speech-Language-Hearing Association, 2016). Overall, a dynamic assessment should help clinicians determine if intervention is warranted and if so, what the targets of intervention should be (Paul & Norbury, 2012). Ongoing assessment and data collection help to determine the effectiveness of the selected intervention.

Functional Assessment of School-Age and Adolescent Populations

The focus of traditional language assessment in school-age and adolescent populations center around describing the nature and extent of the communication disorder, setting goals, and designing an initial framework for intervention. A comprehensive assessment of spoken language should include a combination of informal and formal measures to collect data. Clinicians should

be highly familiar with culturally sensitive language sampling techniques, systematic observations, dynamic assessment (e.g. test-teach-test), and various standardized tests (Paul & Norbury, 2012). Questionnaires and checklists can also be used to collect pertinent data from multiple sources (e.g. student, parent, and teacher) over time.

Following the thorough collection of a relevant case history, the SLP may evaluate the student's oral-mechanism and hearing to rule out structural limitations. An evaluation of spoken language would include assessment in the language domains of phonology, morphology, syntax, semantics, and pragmatics. A literacy evaluation might also be useful in the data collection process, as links between spoken language and literacy skills are well-documented (Catts, 1993; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). Speech sound assessments are also typically included in a spoken language evaluation to rule out the possible impact of an articulation disorder.

Additionally, clinicians must consider the child's language skills as it relates with the specific demands of the classroom. Academic considerations may be even more important with an adolescent population of students as the language demands of the curriculum may increase in middle and high school. A multidisciplinary team should conduct a curriculum-based assessment in order to identify the language demands of the classroom, and to gauge how the student's language disorder is affecting participation and academic performance. The educational team may assess the student's ability to access the curriculum through systematic classroom observations, rating scales, probes, evaluations of student work samples, and direct assessments (Owens, 2014).

Functional Assessment of Students Who Require AAC

The field of AAC has the primary goal to enhance communication and social participation for individuals with little to no functional speech (Light & McNaughton, 2015). Thus, the focus of assessment for individuals who require AAC is to facilitate the most efficient and effective communication possible across settings, communication partners, and contexts. The four general phases of assessment in AAC are referral, initial assessment of current communication needs, detailed assessment of future communication needs, and progress monitoring (Beukelman & Mirenda, 2013). Unlike traditional language assessments that only evaluate information about the client, assessment in AAC must also include assessment of the AAC system, communication partners, and the communication environment in which the communication interactions occur.

Beukelman and Mirenda (2013) describe assessment in AAC as the collection and interpretation of information to help individuals with CCN and their communication partners (e.g. parents, caregivers, teachers) make decisions about: (a) current communication skills, (b) immediate and future communication needs, (c) strategies that facilitate communication and language acquisition, (d) an intervention framework to facilitate use of the chosen strategies, and (e) a reliable method of evaluating outcomes.

Evaluation in AAC can be complex, as current assessment protocols are as varied and diverse as the populations of individuals who use aided communication. Typical assessment in AAC includes a combination of formal measures, criterion measures, and continuum of care assessments. Additionally, intake questionnaires and observations are needed to obtain a well-rounded description of the barriers and facilitators that may affect the child's ability to use AAC.

Ongoing assessment is needed to monitor the language skills and communicative competence of the AAC user, as well as the communication partners and environmental supports. Overall, AAC assessments should include at least one component that evaluates skills in Light's (1989) four areas of communicative competence: linguistic competence, operational competence, social competence, and strategic competence. Linguistic competence includes the individual's receptive and expressive language skills, as well as knowledge of the linguistic code (symbols) that is used on the AAC system. Operational competence includes the knowledge and skills required to operate the AAC system. Examples of operational competencies include being able to navigate between the systems page sets, turn the device on/off, and access the grammar inflections. Social competence is related to pragmatic language skills and includes competencies such as initiating and maintaining a conversation. Being a socially competent communicator also means requesting attention and providing information that is socially and culturally appropriate. Finally, strategic competencies are those skills that are specific to AAC- based communication. For example, a competent communicator using aided communication will be able to convey messages that are efficient and effective by using skills such as rate enhancement techniques (e.g. word/phrase prediction). Together, linguistic and operational competencies provide the tools for communication, whereas social and strategic competencies focus on the effective use of these tools.

As a part of a 30-year reflection on the highs and lows of AAC research, McNaughton and Light (2015) noted that only 7% of published research focused on assessment measurement and instrumentation development. Again, this may be due to the complex nature of AAC assessment, and heterogeneity of the

population. Similar to intervention research in AAC, assessment research has also focused on young children with CCN, excluding older school-age and adolescent populations. Further research is critical to guide evidence-based assessments in this diverse population of individuals. Additionally, given the bi-directional process of communication, assessment protocols are needed to address the strengths and needs of communication partners.

The participation model. Historically, AAC assessment was based on a candidacy model, which was based on an individual's readiness for AAC. This model of the 1970's and 1980's assumed that behavioral and cognitive prerequisites were needed prior to the introduction of aided communication (Romski & Sevcik, 2005). In 2004, ASHA endorsed the use of Beukelman and Mirenda's 1988 Participation Model as the guiding framework for diagnosis and treatment in AAC. Consequently, individuals with CCN should no longer be denied access to communication based on age or ability level (e.g. cognitive, sensory, and motor).

Using a participation model framework, the AAC team first identifies typical participation patterns and then identifies instances where communication or lack thereof interferes with participation for the AAC user. The identified barriers to participation then become the focus of intervention. Beukelman and Mirenda (2013) classify barriers as either access barriers, or opportunity barriers. Access barriers are related to the limitations of the individual's current communication systems, or to their current capabilities (e.g. motor, cognitive, and linguistic). For example, an access barrier to providing a grammatically correct personal narrative might occur if a student lacks access to grammatical morphology on their AAC system.

On the other hand, opportunity barriers are those limitations that are imposed by

people other than the AAC user. These barriers are related to the attitudes, knowledge, and skills of the communication partner. For example, a student may have access to grammatical morphology on their aided system, however, their communication partners may lack the skills to facilitate communicative interactions that support the development and use of such skills. Opportunity barriers may also occur due to current policies and practices that govern schools. Long-standing procedures that have become commonplace are also considered opportunity barriers. A team approach is key to the participation model as communication occurs across different partners and environments.

Intervention Approaches for Children with Spoken Language Disorders

The primary goal of any language intervention approach should be to help students eliminate or change the identified language weaknesses so that they can effectively communicate within the contexts of everyday activities and environments (Owens, 2014). Paul & Norbury (2012) identified four major purposes of language intervention: (a) to eliminate the underlying cause of the language disorder, (b) to change the disorder by improving specific aspects of language (e.g. use of bound morphemes), (c) to teach compensatory strategies (e.g. context clues), or (d) alter the student's environment in such a way that facilitates language learning (e.g. facilitator training). Environmental modification may be a primary purpose for some children and a secondary approach for others.

Educational teams should consider the student's age, holistic assessment data, diagnosis, and intervention history in order to identify the appropriate purpose of the intervention. Next, an intervention plan should be developed to target identified language weaknesses. During this planning process, the team should gather evidence to support

the proposed intervention methods and determine goals that will lead to an increase not only in language skills, but also in effective communication (Dollaghan, 2007). Goals should be targeted within the child's ZPD (Paul & Norbury, 2012; Vygotsky, 1978). For example, a team might develop a language goal for a student to use present progressive tense *–ing* if the student demonstrates a receptive language age between 27-30 months. Since developmental research suggests that children begin to use bound morphemes between 27-30 months of age, this goal would be within the student's ZPD (Brown, 1973).

Once goals have been identified, the team will determine the general intervention approach, or use a combination of approaches based on the student's individual needs (Paul & Norbury, 2012). Educational teams should also evaluate relevant research to examine the effectiveness of similar intervention approaches with students who have similar characteristics and goals. Fey (1986) describes three basic language intervention approaches using a continuum of naturalness. These include: (a) clinician directed (CD), (b) hybrid, and (c) child centered (CC).

Clinician Directed Approaches

Traditional language intervention approaches for the treatment of spoken language disorders have generally been clinician directed. In an attempt to control the clinical environment and highlight the linguistic targets, the clinician selects the activities and materials and determines the acceptable responses and reinforcement schedule (Paul & Norbury, 2012). Drill, discrete trial training, and clinician directed modeling are used within a traditional intervention approach.

Like a drill approach, clinician directed modeling is a highly structured approach with extrinsic reinforcement in a formal context; however, instead of imitating a production, the child is only required to listen (Fey, 1986). Language learning is facilitated as the clinician provides numerous models of the target structure. Research suggests that clinician directed approaches might be the most appropriate to teach language form (e.g. syntax and morphology).

A major disadvantage to clinician directed approaches is that the lack of naturalness may affect the child's ability to generalize the learned material into everyday contexts and conversations. Furthermore, while drill therapy enables clinicians to elicit numerous responses with a set time, this may not be an ideal approach for students with CCN. Research suggests that students with CCN are many times passive communicators, and a drill approach would likely reinforce this passive communication pattern which is characterized by decreased child initiations.

Child-Centered Approaches

For the passive communicator, a child-centered approach may be more appropriate. Child-centered approaches are also known as indirect language stimulation (ILS) (Fey, 1986), developmental pragmatic (Prizant & Wetherby, 2005), or facilitative play (Hubbell, 1988). In this language intervention approach, the clinician systematically arranges the environment, or activity to provide numerous, natural opportunities for the production of general, developmentally appropriate linguistic targets. The clinician then engages in play, or other routine activity while building on the child's communicative utterances. There are no prompts or shaping provided, although the clinician will systematically consequate, or follow-up, the child's communicative utterances (Paul & Norbury, 2012).

This form of linguistic mapping can be accomplished using a variety of techniques including imitations, expansions, extensions, and recast sentences (Paul & Norbury, 2012). When expanding or extending the child's utterance, the clinician builds on the child's utterance by adding semantic details, or grammatical elements. Research suggests that these partner behaviors decrease the amount of linguistic information that the child has to process, which then allows them to focus on the contrastive, more mature form (Owens, 2009; Proctor-Williams, Fey, & Loeb, 2001). Additionally, Saxton (2005) suggests that expansions, which are sometimes referred to as recasts, facilitate development of grammatical structures in children within various diagnostic categories. Both expansions and extensions have been noted to increase the likelihood of the child imitating at least some of the adult's linguistic structure (Scherer & Olswang, 1984).

Overall, a child-centered approach provides language learners with a linguistic map that connects their everyday routines and actions with the language they need to participate. For these partner response behaviors to be facilitative, research suggests that clinicians provide at least one consequating remark per minute (Proctor-Williams & Fey, 2007). Researchers also note that recasts should not be provided for linguistic structures outside of the child's ZPD (Fey & Loeb, 2002). Moreover, indirect language stimulation approaches may be most helpful during Brown's stages IV and V of language development, which generally occur between 35-47+ months of age (Gillum, Camarata, Nelson, & Camarata, 2003).

Hybrid Approaches

Many clinicians favor a hybrid approach to language intervention that uses scaffolding techniques within natural contexts to increase communication. In contrast to

the child-centered approach that targeted general communication, a hybrid approach allows clinicians to focus on specific language targets (Fey, 1986). While the clinician maintains more control over the activity and material choices, the goal of spontaneous communication within real conversational contexts remains. During the intervention, the clinician not only responds, but highlights linguistic forms being targeted (Paul & Norbury, 2012).

Interventions that are considered hybrid include focused stimulation (Cleave & Fey, 1997; Leonard, Camarata, Rowan, & Chapman, 1982), vertical structuring (Schwartz, Chapman, Terrell, Prelock, & Rowan, 1985), milieu communication training (Hancock & Kaiser, 2006; Hart & Risley, 1975), and script therapy (Olswang & Bain, 1991). Using focused stimulation, a clinician provides a high frequency of the target structures within the context of a meaningful activity. While the context is set up in such a way to motivate the child to produce the target structure, a response is in no way required. Research suggests that focused stimulation is effective at increasing both comprehension and production of a language form (Weismer & Robertson, 2006). Furthermore, research evidence exists that supports the use of focused stimulation to address goals within all five domains of language (e.g. semantics, phonology, morphology, syntax, and pragmatics) with both monolingual and bilingual learners (e.g. Cleave & Fey, 1997; Leonard et al., 1982).

In milieu communication training, which is also known as incidental teaching (Hart & Risley, 1975), the clinician utilizes operant approaches within natural contexts to elicit target structures. Characteristics of this approach include: (a) use of environmental arrangement, (b) a responsive interaction between the clinician and child that closely approximates natural learning, (c) the use of a language facilitator as a

reinforcer, (d) a high influence on the context of language, and (e) the use of familiar routines and activities that provide natural conversation scripts (Hancock & Kaiser, 2006; Owens, 2014). During these communicative interactions, a clinician will use their own linguistic input to shape the child's language. Evidence-based strategies for modifying linguistic input include decreasing rate of speech (Sheng, McGregor, & Xu, 2005), providing numerous exemplars of the linguistic target (Camarata & Nelson, 2006; Proctor- Williams et al., 2001), presenting contrastive forms (Fey, Long, & Finestack, 2003), and decreasing linguistic length and complexity (Paul & Elwood, 1991).

Language Intervention Approaches for Students with Complex Communication Needs

Research suggests that approximately 50% of school-based SLPs have students with CCN on their caseloads, thus creating a need to develop efficient and effective service delivery models in AAC. The ultimate outcome of any AAC intervention is communicative competence for the individual with CCN. Communicative competence provides the AAC user with "the ability to communicate functionally in the natural environment and to adequately meet daily communication needs" (Light, 1989, p. 143). Current treatment guidelines come from research focused on young children who use aided communication. However, individuals who demonstrate significant speech impairments and use augmented communication often demonstrate associated expressive language impairments; therefore, clinicians can look to intervention research on spoken language disorders to supplement gaps in the AAC literature.

Moreover, successful AAC interventions require more than the provision of an AAC system, which is merely a tool of aided communication. A person's ability to use language at a level that allows them to create spontaneous novel utterances across settings is actually what leads to communicative competence (Beukelman &

Mirenda, 2013). In order to use aided communication, a person must understand the meanings behind each symbol, or combination of symbols, as well as how to use the symbolic language in various communicative contexts. There are four general approaches to AAC intervention: (a) explicit instruction (Reichle & Drager, 2010) and incidental teaching (Cowan & Allen, 2007; Hart & Risley, 1982), (b) conversational coaching (Hunt, Alwell, & Goetz, 1988), (c) strategy instruction (Ellis, Deshler, Lenz, Schumaker, & Clark 1991), and (d) language modeling techniques (Dada & Alant, 2009; Drager et al., 2006; Elder & Goossens', 1994; Goossens' & Crain, 1986). These approaches, and models within these approaches, are similar to those described in spoken language disorder research.

Explicit Instruction and Incidental Teaching

Explicit instruction of linguistic targets may take the form of recasts. Similar to intervention strategies used with spoken language disorders, a communication partner can facilitate language use by matching and expanding the child's utterance. For example, a child may produce a symbolic message of BIG TRAIN and the facilitator might provide a corrective recast by saying *Yes, those are two big trains*, while modeling BIG TRAIN +S on the child's AAC system. Many times, explicit instruction is used in conjunction with incidental teaching. Incidental teaching procedures, which may include the use of expectant time-delay and mand-model, generally occur in the contexts of everyday routines and activities (Hart & Risley, 1982). A clinician will begin by arranging the environment to create numerous communication opportunities that are naturally motivating for the AAC user. Next, the clinician will provide instruction, or necessary prompts to elicit the target structure. Overall, research suggests

that explicit instruction and incidental teaching are most effective when used together (e.g. Nigam, Schlosser, Lloyd, 2006; Sigafoos & Reichle, 1992).

Strategy Instruction Model (SIM)

There is a growing body of evidence supporting the use of a strategy instruction model in AAC interventions. Research has shown positive effects in the areas of conversational skills, social interaction skills, grammar skills, and communication partner training (e.g. Binger, Maguire-Marshall, Kent-Walsh, 2011; Kent-Walsh & McNaughton, 2005; Light & Binger, 1998; Lund & Light, 2003). When using AAC strategy instruction, the clinician and AAC stakeholders should determine the target skill(s) and clarify why the skill is important and valuable to the overall communication of the AAC user, or to the facilitator. Next, the clinician should use a combination of skill demonstration, guided practice, role-play, and feedback to instruct the AAC user, and/or communication partner (as indicated) on the targeted skill(s) (Beukelman & Mirenda, 2013). Furthermore, the clinician should use a least-to-most prompting hierarchy to allow the practice to be as natural as possible. Use of the targeted skill(s) should be monitored to gauge the effects of instruction until a criterion level of 80% spontaneous use, over at least two consecutive sessions is recorded (Light & Binger, 1998). Finally, generalization probes should be conducted to evaluate the intervention effects across activities and/or settings. Additional feedback, role-play, or guidance should be offered to facilitate generalization, if necessary.

Language Modeling Techniques

Modeling arises out of the social learning theory, which suggests that children learn language within a social context. It is the high quality communicative interactions with parents and other adults in their environment that shape how children

communicate and learn language. Research also suggests a direct correlation between the number of words that a child hears and the child's language development (Hart & Risely, 1975). Children who use AAC typically experience an "asymmetry between the modalities of input to output" (Smith & Grove, 2003, p. 163). In essence, their communication partners are providing verbal models, but not models of their expressive language modality (i.e. AAC system).

AAC modeling developed as a solution for overcoming the asymmetry of language input to the expected output. During AAC modeling-based interventions, communication partners model aided AAC while they speak, and engage in naturalistic communication. Kraat (1985, p. 21) defines a naturalistic communication interaction as a "dynamic process between at least two people, which is highly interactive, bi-directional and multi-modal" (e.g. shared book reading). There are a number of modeling intervention packages that appear in research: (a) aided language stimulation (ALgS: Goossens', 1989), (b) aided AAC modeling (Binger & Light, 2007), (c) aided language modeling (Drager et al., 2006), and (d) natural aided language (Cafiero, 2001). These techniques, which are frequently used during highly motivating activities, help AAC users to establish a connection between the language needed for the activity, and the symbolic language that can be generated. This connection occurs as the AAC user watches the communication partner utilize the available symbols on the child's speech generative device (SGD) to moderate the communication during the activity (Goosens', Crain, & Elder, 1992).

There are a handful of studies that have examined the use of language modeling techniques to increase the grammatical morphology use of children who use aided communication (see Sennott, Light, & McNaughton, 2016). One such study (Binger et

al., 2011) used AAC models and recasts with a time delay to facilitate the use of morphological inflections in three children, ages 6, 9, and 11. Each child had prior AAC experience using a Prentke Romich™, Unity based SGD, and exhibited a receptive vocabulary score above 36 months. The primary disability diagnosis of the participants was either cerebral palsy or childhood apraxia of speech. During the context of a book reading activity, the primary researcher provided a minimum of 10 AAC models of the targeted morphological structures on the child's AAC system. Results demonstrated an increase in all morphological forms (e.g. verb+-ing, possessive -'s, regular past tense -ed, plural -s).

Overall, there is emerging evidence supporting the use of language modeling techniques to facilitate language acquisition across the skills of children who use aided communication. However, there is a need to expand this line of research to include participants of varying disabilities and age groups, as well as with participants who use AAC systems other than the Unity based systems. Additionally, researchers will need to assess the feasibility of utilizing such interventions in more natural settings (such as the classroom and at home).

School-based Functional Interventions

Public schools are mandated to provide auxiliary support services that enable students with CCN to communicate as well as students without communication impairments (Individuals with Disabilities Education Act, Title II of the Americans with Disabilities Act of 1990, and Section 504 of the Rehabilitation Act of 1973). In addition, the No Child Left Behind Act (NCLB) of 2002 holds professionals accountable for providing students with disabilities equal opportunities to the general education curriculum. School based SLPs are often times tasked with guiding the AAC team

(Calculator & Black, 2009). Given the paucity of research in the field of AAC and time constraints during the day, providing appropriate services to students with complex communication needs can be challenging for clinicians (Johnson, Inglebret, Jones, & Ray, 2006).

The application of evidence-based practices in the field of AAC requires clinicians to assess stakeholder and student perspectives, as well as review current research evidence (Dodd & Hagge, 2014). ASHA (2002) published a position statement that presents the roles and responsibilities of the SLP with respect to AAC. ASHA recommends that clinicians support the communication goals of individuals who require the use of AAC by collaborating with stakeholders and providing evidence-based interventions that will promote and enhance the individuals' quality of life. A functional language approach to intervention uses a "communication first" approach. The overall focus is not only on the student, but also with that student's communication partners (Owens, 2014).

Light and Binger (1998) provide clinicians with the following 7-step, general instructional model to use when teaching new communication skills in individuals who require AAC: (a) specify the goal and complete baseline data, (b) select appropriate vocabulary, (c) teach communication partners strategies to support the AAC user in acquiring the new skill, (d) teach the target skill to the individual who uses AAC, (e) assess for generalization, (f) evaluate communication outcomes, (g) complete maintenance checks. Overall, the focus of AAC instruction should expand from an emphasis on teaching expression of basic wants and needs to include communication activities that promote social interaction and social connectedness (Trottier, Kamp & Mirenda, 2011).

In order to achieve success in school, adolescents who use aided communication must be able to comprehend and use language effectively. There is evidence to suggest that adolescent students with CCN may exhibit decreased academic performance, and have limited vocational opportunities (Batorowicz, Campbell, von Tetzchner, King, & Missiuna, 2014; Drager, Light, & McNaughton, 2010). The ultimate goal for inclusive education for students who use AAC is for them to be able to meaningfully participate academically and socially in the educational setting. Educational teams (i.e. teachers, SLPs, EAs) can facilitate this inclusion through the use of instructional and environmental supports, and collaboration among the team (Beukelman & Mirenda, 2013). Once these accommodations are in place, the educational team can use the participation model framework (Beukelman & Mirenda, 2013) to guide the implementation of the student's individualized education plan (IEP). As previously noted, educational teams can use the participation model to identify potential access (e.g. lack of available vocabulary, or increased WM demands), or opportunity barriers (e.g. lack of facilitator knowledge or skills) to participation that may be impacting the AAC user. Once these barriers are identified, the team can design interventions to reduce, or eliminate the impact of the barrier.

Agents of intervention. One key indicator of successful implementation of an AAC instructional program, in the school setting, is the knowledge and skill level of the communication partners (Soto, Muller, Hunt, & Goetz, 2001). For school-age children who require the use of AAC, the opportunity to develop expressive language skills may be limited due to restricted vocabulary, limited partner responses, and decreased communicative interactions (Botting, 2002). Many students who use aided communication rely on the instruction and support of EAs (i.e. paraeducators or

instructional assistants) in the school environment. Kent-Walsh & Light (2003) noted that EAs might have a significant influence on the communication outcomes of children who used AAC as they may serve as the students' one-on-one academic instructor and social communication partner. Despite being identified as an important stakeholder of a child's AAC team, EAs receive little to no training on intervention techniques (Binger et al., 2010).

Intervention Strategies for Students who Require AAC

Naturalistic Instruction

In addition to partner response strategies, environmental arrangement plays a critical role in language development for children who require AAC. Again, typical language development occurs naturally within the rich contexts of social interaction between novice communicators and their communication partners (Tomasello, 2001). This process involves the two communicators discussing a shared focus using vocabulary and language models that are relevant to the child's communication modality. Benigno and McCarthy (2012) describe a "quadratic interaction" that occurs when communicating with an individual who uses AAC. There is still a shared focus between two communication partners and the referent; however, the AAC system becomes a fourth component that adds an extra layer of complexity to this interaction (Benigno & McCarthy, 2012). AAC learners do not naturally know how to produce aided communication and communication partners do not naturally know how to engage in these quadratic interactions. Consequently, it becomes vital to add an instructional component to any AAC protocol that promotes naturalistic interactions between the communication partner and AAC user.

Naturalistic instruction includes selecting the context for AAC intervention. The context of intervention should be one that is highly motivating for the child, provides a high volume of communication opportunities, and is appropriate for the child's current level of development (Light & Drager, 2012). Additionally, professionals and AAC stakeholders must set up the environment to maximize communication. Light and Drager identify three critical components of environmental arrangement in AAC intervention: (a) the communication partner should be positioned as to maximize the social interaction with the child, (b) the child should be positioned to decrease sensory and physical demands, and (c) the AAC system should be incorporated appropriately throughout everyday routines.

Ganz and colleagues conducted a meta-analysis of single case research related to the use of AAC in children with autism (Ganz, Heath, & Rispoli, 2012). Of the twenty- four studies reviewed, nine cited naturalistic strategies as the primary intervention or teaching method. Overall, positive effects were noted across all communication outcomes and while not as strong, gains were also noted in behavior outcomes (i.e. impact on social skills and challenging behaviors). Furthermore, naturalistic interventions, such as prompting, environmental arrangement, and modeling of communication behaviors have led to gains in communication outcomes for individuals who use AAC (Cafiero, 2001; Nunes & Hanline, 2007).

Integrated Approaches

One of the most frequently implemented interaction strategies in a partner instruction program is aided modeling (Shire & Jones, 2015). Children who use aided communication are at risk for language delays (Beukelman & Mirenda, 2013); however, research suggests that the incorporation of an AAC modeling intervention

approach, coupled with communication partner interventions can lead to gains across the domains of language (Sennott et al., 2016). Specifically, findings demonstrate consistently positive, large effects for semantic, syntactic, pragmatic, and morphological development in young children following modeling interventions (Binger & Light, 2007; Binger et al., 2011; Dada & Alant, 2009; Romski et al., 2010).

Research also suggests that communication partners should provide modeling within a naturalistic communication interaction. Based on research and the strong theoretical framework supporting early language acquisition in children, one could surmise that these interventions are valuable components to any intervention protocol for students who use aided communication.

Communication Partner Instruction

Early language development in young children typically occurs naturally, as the novice communicator engages in social interactions with a competent communication partner (Tomasello, 2001). Although this language learning process is similar for children who use aided communication, the AAC system creates an additional dynamic. The use of intentional communication in children is directly linked to the responsiveness of the communication partner (Yoder & Warren, 1998); therefore, training of AAC stakeholders becomes paramount to the success of any intervention program. Without training, communication partners of children with CCN typically dominate conversations, which lead to decreased initiations and response behaviors by the AAC users (Kent- Walsh & McNaughton, 2005). Within the participation model, Beukelman and Mirenda (2013) would refer to this as an opportunity barrier. It is then necessary to create a partner instruction model of intervention to support AAC stakeholders, so that the quality of communication is

such that language learning and communication can take place. Stakeholders include any individual that has consistent interaction with the AAC user.

Clinicians can use a strategy instruction model as a framework for teaching communication partners functional communicative interactions. One such framework that provides a communication partner instruction protocol is the Improving Partner Applications of Augmentative Communication Techniques (ImPAACT) program (Binger, Kent-Walsh, Berens, Del Campo, & Rivera, 2008; Binger, Kent-Walsh et al., 2010; Kent-Walsh, Binger, & Malani, 2010). Many components of the ImPAACT program, including role-play, modeling of target skills, and coached practice, are elements of an evidence based SIM approach to intervention. Moreover, a successful partner instruction approach should include the following three components: (a) identification of the partner, (b) identification of the skill or strategy to be taught, as well as the determination of the context in which the intervention will take place, and (c) the determination of the length of the instructional program (Kent-Walsh et al., 2010).

Possible candidates for a communication partner instruction program may include EAs, teachers, caregivers, and/or peers. Shire and Jones (2015) conducted a systematic review to determine the efficacy of communication partner instructional programs. Out of the 13 studies reviewed, 10 studies selected parents (87 mothers, 8 fathers) as the adult participants, and the other 3 studies selected EAs who had a range of experience with AAC (Shire & Jones, 2015). One might reason that EAs and parents were selected as the participants based on the facts that they spend a large amount of time with the AAC user and most likely have not received prior training. Large effects were noted for outcomes that measured the communication partners' use of fidelity of

intervention implementation (Shire & Jones, 2015). Positive gains were noted with child outcomes as well, specifically in the areas of semantics, turn-taking, and AAC use (Shire & Jones, 2015).

Prior to beginning a partner instruction-training program, the researcher or clinician must identify the strategy or skill to be taught. Skills targeted in the ImPAACT studies have included aided AAC modeling, expectant delay, Wh- question asking, verbal prompting, and contingent responding (Binger et al., 2008; Binger et al., 2010). Kent- Walsh, Binger, and Malani (2010) describe the following three characteristics of effective partner strategies: (a) they can be expressed as a series of logical steps, (b) their use results in positive, measurable outcomes for the partners, and (c) their use results in positive, measurable outcomes for the AAC users. Furthermore, the strategy should be simple enough for the communication partner to use it effectively in various situations. Acronyms and mnemonics are frequently used in partner instruction programs (e.g. RAA!, Binger et al., 2010).

A separate study by Douglas, Light and McNaughton (2012) taught EAs to increase the communication opportunities of children with CCN by teaching them two communication interaction strategies (IPLAN [Identify activities for communication, Provide means for communication, Locate and provide vocabulary, Arrangeenvironment, use iNteraction strategies] and MORE [Model AAC, Offer opportunities for communication, Respond to communication, Extend communication]). Large effects were noted for both the adult and student outcomes during the intervention and maintenance phases (Douglas et al., 2012). Evidence suggests that communication partners can facilitate language acquisition by providing numerous opportunities for communication paired with at least 5-10

seconds wait time for the child to process and respond (Binger et al., 2010; Fox, Dunlap, & Philbrick, 1997; Light et al., 1985). Other skills taught during partner instruction programs include shared book reading, picture exchange communication system (PECS), natural aided stimulation, environmental arrangement, milieu, and naturalistic teaching strategies (Shire & Jones, 2015).

Although generalization of the learned skill or strategy is the ultimate goal, researchers caution clinicians and researchers to initially limit the context of instruction (e.g. play, reading, snack time) (Kent-Walsh, Binger, & Malani, 2010). This allows the partner to practice and potentially master the instructional skill prior to moving on to a new context. Additionally, a single setting is often more feasible for many professionals already pressed for time. Research suggests that the average length of time needed for a successful partner-instruction program is between 2-2.5 hours (Binger et al., 2010; Douglas et al., 2012; Kent-Walsh , Binger, & Malani, 2010).

Overall, research suggests that communication partner instruction used within an AAC intervention program will likely result in improved communication outcomes for the individual who uses AAC (see Kent-Walsh et al., 2015; Shire & Jones, 2015). Specifically, partner instruction has been shown to reduce the opportunity barriers of facilitator knowledge and skills (Beukelman & Mirenda, 2013), resulting in improved communicative interactions between the AAC user and their respective communication partner. Additionally, there are recognized frameworks (e.g. ImPAACT program) that clinicians can use, within the suggested practice of "role release" (American Speech-Language-Hearing Association, 2002) in order to expand service delivery to include key stakeholders. In essence, implementation of communication partner training challenges clinicians to become effective trainers, as well as effective clinicians.

Limitations and gaps. The systematic review by Shire and Jones (2015) identified potential unknowns and limitations of communication partner instruction research. Of particular concern is the relevance of device training, timing of partner training, appropriate communication targets for the individuals who use aided communication, and the long-term outcomes that are noted in generalization and maintenance phases (Shire & Jones, 2015). Additionally, there is a paucity of information in regards to the communication partner's AAC proficiency. There is no mention regarding whether the partners had any type of device training prior to the instructional programs. If feasible, this may be a component that should be added to future partner instruction programs (Shire & Jones, 2015). Furthermore, Shire and Jones noted that future research should include a baseline-level of AAC experience for the partner and child. Despite these limitations, research provides preliminary evidence of moderate methodological quality to support the use of partner instruction programs to help communication partners facilitate language learning and communication of young children who use AAC (Shire & Jones, 2015).

Kent-Walsh and colleagues (2015) recently completed a meta-analysis of the effects of communication partner instruction on the communication skills of AAC users. The findings indicated that while partner instruction programs are crucial to AAC assessment and intervention, the implementation of such programs are often overlooked. Barriers to implementation may include lack of time to provide indirect interventions, as well as lack of reimbursement avenues for time spent working with communication partners (e.g. Kent-Walsh, Stark, & Binger, 2008). Therefore, when conducting research in the area of communication partner instruction, researchers must consider the feasibility of such interventions within their respective settings and participant groups.

The meta- analysis also indicated a need to increase methodological rigor in communication partner research, with a focus on the provision of detailed participant and procedural information. Furthermore, research is needed to expand the communication contexts to include vocational, social, and academic settings.

ImPAACT program. The ImPAACT program is based on Kent-Walsh and McNaughton's (2005) 8-step instructional approach for teaching communication partners how to facilitate language outcomes of individuals who require aided communication. Kent-Walsh and colleagues have published multiple studies that examine the use of the ImPAACT program to teach communication partners to increase turn-taking rates and multi-symbol message productions of young children who require AAC (see Kent-Walsh et al., 2015). The results provide support for the use of a structured partner intervention program that utilizes five main instructional techniques: (a) video review, (b) modeling, (c) role play, (d) verbal rehearsal, and (e) coached practice (Kent-Walsh et al., 2015).

In a pilot study, Kent-Walsh (2003), taught paraprofessionals to use modeling, expectant delay, Wh-question asking, and contingent responding during individual instruction and shared storybook reading. Language outcomes showed marked improvements in both communicative turns and the number of novel semantic concepts produced. Moreover, the ImPAACT program has maintained large effect sizes when applied to different communication partners and language outcomes. Specifically, researchers have applied this model to teach stakeholders, such as parents and EAs to successfully implement target skills to increase the turn taking and multi-message productions of AAC users during shared storybook reading tasks (Binger et al., 2010; Binger et al., 2008).

While the research to date provides some evidence of the benefits of communication partner training, there are overt gaps in the literature. Currently, there is limited research on preparing EAs to interact with adolescent students in a school setting, and even less on providing communication interactions that support grammatical development (Kent-Walsh et al., 2015). In fact, only one adolescent participant was noted in a recent descriptive analysis of participant characteristics in communication partner research (Kent-Walsh et al., 2015). In addition, most educational assistant training programs have focused on non-academic tasks (e.g. play) with activity based communication displays, which are not functional for an adolescent population of students who need access to curricular material and symbolic language that supports motor planning and spontaneous novel utterance generation.

Significance of the Problem

Despite the mounting research evidence that supports training communication partners to facilitate language learning and communication of young students who use augmentative and alternative communication (AAC), there is a paucity of research examining the impact on an adolescent population. Furthermore, grammatical errors are common in children who use aided communication (see Binger & Light, 2008 for review). Yet, research on grammatical language interventions for older children with complex communication needs (CCN) is lacking, leaving little guidance for practicing clinicians. Communication and language goals of adolescents center around social communication, academic success, and preparation for transitional programs (McNaughton & Beukelman, 2010; Smith, 2015). Additionally, educational assistants (EAs) play a pivotal role as a communication partner for adolescent students with CCN, frequently supporting curricular access.

Purpose of the Study

This study sought to expand the research base regarding communication partner interventions to evaluate the viability with an adolescent population of AAC users in the context of a curriculum-based reading activity. Moreover, communication partner programs have historically targeted limited child language outcomes (e.g. turn taking, semantics, multi-word utterances). This study examined the potential benefits to include an additional area of grammatical morphology. Research suggests that training communication partners leads to an increase in expressive and receptive language skills for children with CCN (Binger et al., 2008; Binger et al., 2010; Douglas et al., 2012; Kent-Walsh et al., 2015). Furthermore, an increase in expressive communication should also increase the student's ability to engage in autonomous communication, which increases their ability to establish and maintain social connectedness and overall quality of life.

Conclusions

This study attempted to: (a) maximize the communication environment to increase the potential for participation by training EAs to interact with the AAC user during an academic activity, and (b) increase the students' linguistic skills through the use of language intervention strategies that facilitate use of developmentally appropriate grammatical structures. The results of this study were used to answer the following experimental questions:

1) What are the effects of implementing a communication partner instruction approach on EAs' implementation of the adapted RAAP! interaction strategy during shared reading activities?
2) What is the impact of the EAs' implementation of the interaction strategy on the

grammatical morphology use of their adolescent students who use AAC?

Based on these questions, the following hypotheses were developed:

1) There will be an increase in the EAs' use of the adapted RAAP! interaction strategy during the shared reading activities.
2) There will be an increase in the students' expressive use of grammatical morphology during the shared reading activities.

Chapter III

METHODOLOGY

All methods and procedures were approved by the Institutional Review Board (IRB) of Valdosta State University (see Appendix A). Informed consent was obtained from the educational assistants and from students with CCN and their parents.

Research Design

The study used a single subject, non-concurrent multiple baseline probe design (Holcombe, Wolery, & Gast, 1994) across three dyads to measure two dependent variables. Each communication dyad included one educational assistant (EA) and one student with CCN. The primary dependent variable was the percentage of interaction strategy steps correctly implemented by each EA during a reading activity with their student. The dependent measure collected on the student participants included the percentage of grammatical morphemes produced within the reading activity.

The study was implemented in three phases: baseline, instruction and intervention, and maintenance. To provide for greater experimental control, the timing of the phases was staggered across the communication dyads by at least one week. A non-concurrent design provided additional control for the following threats to internal validity: maturation, test-retest, and instrumentation changes (Harvey, May, & Kennedy, 2004). Finally, a social validity measure was included to determine the perceived effectiveness of the training by the EA and classroom teacher (see Appendix B).

Participants

Three students who required AAC and their EAs participated in the study. All participants resided in a rural southeast Georgia community. Dyads were formed with each educational assistant providing instruction to the student that they typically assisted in the classroom.

Educational Assistant (EA) Participants

EA selection criteria. The researcher recruited EAs based on selection criteria, which was adapted from the criteria set forth in the ImPAACT studies (see Kent-Walsh et al., 2015 for a review). Criteria for EA selection included the following: The EA participants (a) worked in a special education classroom containing at least one adolescent student who used AAC; (b) worked with the AAC user for at least one month; (c) had at least a high school diploma or equivalent; (d) had no known current speech, language, or hearing impairments; and (e) implemented the adapted RAAP! interaction strategy in less than 25% of opportunities during reading interactions using a News-2-You™ article (see Appendix C) with their students prior to the beginning of the investigation. The investigator personally invited the nominated EAs to participate in the study. Both descriptive and criterion measures were used to collect information and baseline data on the EAs. As such, the EAs (a) completed a participant demographic form (see Table 2), and (2) participated in shared storybook reading interactions with their student prior to training.

Student Participants

Student participation criteria. Once consent was obtained by the EA, the researcher nominated student participants within the EA's classroom based on the following criteria adapted from Bedrosian's (1999) selection criteria for AAC interactive

storybook reading research. The participants (a) were enrolled in a public elementary, middle, or high school; (b) were between the ages of 12-17; (c) presented with a severe, congenital motor speech impairment (i.e. less than 50% comprehensible speech in the "no context" condition of Dowden's (1997) Index of Augmented Speech Comprehensibility in Children (I-ASCC); (d) had prior experience using an iPad® with the Proloquo2Go™ communication application (app) as a means of AAC; (e) had a receptive vocabulary age of at least 24 months as measured by the Peabody Picture Vocabulary Test, Fourth Edition (PPVT-4, Dunn & Dunn, 2007); (f) listened to a News-2-You™ article and answered simple wh-questions based on the article with at least 70% accuracy (e.g. "Who?" "What?"); and (g) had hearing and vision within (or corrected to be within) functional limits as recorded on their most recent school hearing and vision screening. Student special education files were reviewed to gather background information on present levels of performance and applicable testing results (e.g., hearing and vision screenings).

Background information was collected using demographic questionnaires prior to the start of the study. For the student participants, information was gathered about their ethnicity, primary disability, speech and language skills, and communication modes (see Appendix E). Additionally, the primary researcher administered the Word Structure (WS) subtest of the Clinical Evaluation of Language Fundamentals - Fifth Edition (CELF-5, Wiig, Semel, Secord, 2013) to each student participant to identify potential linguistic targets for the grammar intervention (see Table 1). Pseudonyms were used to protect the identity of all participants.

Screening of student skills. Stimuli from the I-ASCC (Dowden, 1997) were used to measure students' speech intelligibility. This non-standardized measure identifies single-word speech comprehensibility in children.

The Dynamic AAC Goals Grid-2© (DAGG-2) (Dowden, 1997; Tobii Dynavox, 2015) was administered as a skills checklist to describe the students' observable communication behaviors. The ability level continuum provided insights into how the students were communicating prior to intervention, while also highlighting strengths and potential linguistic targets.

The PPVT-4 (Dunn & Dunn, 2007) was used as primary assessment measures for receptive vocabulary, as this assessment does not require the student to expressively communicate their responses. Portions of the Word Structure subtest of the CELF-5 were administered to assess the students' ability to apply word structure rules (i.e. morphology) to denote inflections. This assessment required expressive responses, therefore, the students had the option to respond through various communication modalities (e.g. augmentative communication, natural speech). Two probes were administered for each grammatical morpheme. The percentage of accuracy is noted in Table 3.

Dyad Profiles

*Dyad 1 (Anita and Alex)***.** Anita, age 52, had earned an associate's degree. She had 7 years of experience working with students in a special education classroom. For the last 4 years, she worked with students who used various types of communication devices. At the beginning of the study, she had been working with Alex for almost two months and had some baseline knowledge of how to operate his communication device.

Table 1. Results of the Word Structure subtest of the CELF-5

CELF-5 (WS) Morphemes	Alex	Brianna	Cole
Regular Plural	50%	50%	0%
Irregular Plural	50%	50%	50%
Third Person Singular	0%	0%	0%
Possessive Nouns	0%	0%	0%
Auxiliary + -ing	50%	0%	0%
Regular Past Tense	0%	0%	0%
Irregular Past Tense	0%	0%	0%

Table 2. EA participant demographics

Name	Age, sex	Highest level of education completed	Years of classroom experience	Years of AAC experience	Racial/ ethnic Background
Anita (Alex's EA)	52, F	Associate's degree	7	4	Anglo
Brooke (Brianna's EA)	36, F	Bachelor's degree	12	12	Anglo
Cassie (Cole's EA)	55, F	Bachelor's degree	11	1	Anglo

The classroom teacher that Anita worked with used the News-2-You™ articles weekly, so she was also familiar with the reading material. She also attended a school-based AAC training the year prior, and had assisted in at least four speech therapy sessions with students who used AAC.

Alex, a freshman in high school, was 17 at the start of the study. A psychologist diagnosed him with autism when he was three years of age. School records indicated that his hearing and vision were within normal limits. Intellectual testing using the Kaufman Brief Intelligence Test-2 (KBIT-2, Kaufman & Kaufman, 2004) resulted in the following scores: Verbal Intelligence Quotient (IQ) 58; Nonverbal IQ: 78. Alex had used aided communication since he was 9 years old. For the past 3 years, he used the communication application Proloquo2Go™ on his personal iPod® and classroom iPad®. While Alex prefers to use AAC to communicate in small settings with familiar communication partners, he frequently uses gestures and a handful of words to communicate with his peers. He received speech therapy services in the school setting to increase language and communication skills.

Dyad 2 (Brooke and Brianna). Brooke, age 36, held a bachelor's degree. She had 12 years of experience supporting students with disabilities, including those who required AAC. Brooke worked with Brianna for approximately 5 months before the start of the study and had some baseline knowledge of her communication system. She assisted in an English/Language Arts classroom that also frequently used the News-2-You™ reading material.

Brianna age 13 was a seventh grade student in a self-contained, life skills classroom at the beginning of the study. A review of educational records revealed that

she had medical diagnoses of Prader-Willi syndrome and childhood apraxia of speech (CAS). Hearing and vision were noted to be within normal limits. Results from administration of the KBIT-2 (Kaufman & Kaufman, 2004) indicated that Brianna's overall nonverbal IQ was 51. Brianna first began using AAC (e.g. DynaVox Maestro) around 9 years of age to supplement her speech, however, she began using an iPad® with the communication application Proloquo2Go™ around the age of 12. The iPad® was a preferred device for Brianna based on portability and social acceptability by her peers. Brianna received speech and language therapy services to increase overall communicative competence.

Dyad 3 (Cassie and Cole). Cassie, age 55, recently completed her Bachelor's degree in Interdisciplinary Studies with a major in English as a Second Language (ESOL). She had 11 years of experience supporting students with disabilities, however, she reported limited experience with students using AAC. For the past year, Cassie worked in a self-contained, life skills classroom with a health and social studies teacher. She did not have any experience with the News-2-You™ reading material prior to study participation. While Cassie provided academic support for Cole prior to intervention, she rarely used his device and had limited operational knowledge. Moreover, she received little prior training in the area of AAC.

Cole, age 17, was a freshman in high school at the start of the study. He was a Hispanic male whose bilingual family spoke Spanish and English. Cole spoke primarily English, but used a handful of Spanish words (e.g. "agua"). He had a medical diagnosis of Down syndrome. A student records review revealed hearing and vision to be within normal limits. Full scale IQ using the Universal Nonverbal Intelligence Test-Second

Table 3. Student participant demographics and assessment results

Name, ethnicity	Age, sex	Disability	I-ASCC context unknown	PPVT-4 (AE)	DAGG-2© Ability Level	Communication modes	Target Vocabulary
Alex, Anglo	17-M	Autism	10%	7;4	Transitional-Independent	Natural speech, Proloquo2Go™, gestures	Plural –s, -es Irregular Plural Possessive –'s Auxiliary –ing Regular Past Tense Irregular Past Tense
Brianna, African-American	13-F	Prader-Willi syndrome, CAS	33%	6;9	Context-Dependent	Natural speech, Proloquo2Go™, gestures	Plural –s, -es Irregular Plural Possessive –'s Auxiliary –ing Regular Past Tense Irregular Past Tense Third Person Singular
Cole, Latino	17-M	Down syndrome	0%	7;6	Context-Dependent	Natural speech, Proloquo2Go™, gestures	Plural –s, -es Irregular Plural Possessive –'s Auxiliary –ing Regular Past Tense Irregular Past Tense

Note. CAS= Childhood apraxia of speech; I-ACSS= Index of Augmented Speech Comprehensibility in Children (Dowden, 1997); PPVT-4=Peabody Picture Vocabulary Test, Fourth Edition (Dunn & Dunn, 2007); DAGG-2=Dynamic Assessment Goals Grid, Second Edition (Dowden, 1997; Tobii-DynaVox, 2015).

Edition (UNIT; Bracken & McCallum, 1998) was reported to be 59. Cole began using an iPad® with the communication app Proloquo2Go™ at the age of 14 to supplement his speech. Cole received speech therapy services to increase language and communication skills.

Setting

The study was conducted in two different public schools located in the Southeast region of the United States. All three schools used the Unique Curriculum and associated News-2-You™ reading articles. Data for the study was collected in a small, quiet room outside of the classroom to decrease distractions and background noise and to promote attention between the EA and the student.

Instrumentation

The informational reading material used in the study was the weekly News-2-You™ newspapers (see Appendix D). These newspapers were selected based on their familiarity to the EAs and students, and their shared symbol-set (i.e. SymbolStix™) with the students' communication app, Proloquo2Go™. News-2-You™ is a computer-based, weekly newspaper that is used in many special education classrooms to teach and expand communication and literacy skills. Furthermore, the weekly papers provided an engaging, age-appropriate platform that followed grade level educational standards in the areas of reading, writing, listening, and speaking. Each newspaper comes in five different levels ranging from symbol supported text to text only. Participants in the study utilized the symbol-supported, regular version of the newspaper to decrease the overall cognitive load required for the reading interaction. Each News-2-You™ paper includes an activity based communication board, however, these boards do not offer grammar

support, or the opportunity for communication partners to model grammatical morphology. However, the researcher used the communication boards as a guide to determine the necessary fringe vocabulary that was programmed into the student's SGD for each newspaper (see Appendix C).

Materials also included an iPad® Air, second generation, and the communication app Proloquo2Go™, which was used as the SGD for each student. This AAC app, developed by AssistiveWare™ is intended to provide users with a research-based, robust vocabulary that supports language development. The participants used Prolquo2Go™ on an iPad® with a core word vocabulary grid size of 7 X 11. As previously noted, Proloquo2Go™ uses SymbolStix™, which is the same symbol set used in the News-2-You™ weekly articles. Additionally, Proloquo2Go™ uses the Crescendo™ vocabulary layout, which offers easy access to core vocabulary words to increase communication efficiency. Core vocabulary (e.g. "turn", "go", "put") are the set of high-frequency words that make up approximately 80% of what we say (Banajee et al., 2003). In Crescendo™, the core vocabulary buttons appeared in the same format on each fringe, or template page, thus increasing language acquisition through motor planning. Research suggests that grammar instruction in AAC is not appropriate during activities with a high cognitive load (Binger & Light, 2008). In an attempt to decrease the required cognitive load of the reading activity, the researcher used an existing reading template in Proloquo2Go™, while adding the needed fringe vocabulary for each news article. In doing so, the students didn't have to navigate away from the reading page set, thus decreasing the cognitive demands of the activity.

Prior to the start of the study, the researcher created one vocabulary display for each weekly newspaper using the reading template in the Proloquo2Go™. Each vocabulary display was then saved as the title of the newspaper and stored in the school reading folder for easy retrieval during the study. Each communication dyad was then able to select the appropriate page set to accompany the selected newspaper, while having access to the entire AAC app.

Grammar support for verbs, nouns, pronouns, and adjectives were also provided to further support the language development of the AAC user. Access to automatic inflections was utilized by holding down the desired button until the inflections popped up (see Appendix D). The user then selected the desired linguistic form. For example, if an individual wanted to access the past tense form of "run", he would touch and hold "run" to bring up the inflection popup, and then select "ran".

Procedures

The investigation was conducted in three phases: baseline, instruction and intervention, and maintenance. All three dyads participated in all phases of the investigation. A Flip™ video camera was used to record probe data in all phases of the study. All sessions took place in a quiet room within the school, but outside of the classroom.

Baseline

In baseline (i.e. Step 1), the EA and student participants were observed in three News-2-You™ article reading interactions. The EAs were instructed to interact with their student as they normally would during each reading activity. Shared reading interactions were video-recorded and analyzed for the dependent variables (i.e. the percentage of

Table 4. EAs' Baseline Use of AAC Language Facilitation Strategies

Language Strategy	Anita	Brooke	Cassie
Provision of SGD	Observed	Observed	Observed
Language modeling (ALI)	Not Observed=0	Not Observed=0	Not Observed=0
Wait Time (at least 5 seconds)	1	2	Not Observed=0
Language recast/expansion	Not Observed=0	3	Not Observed=0
Use of open-ended questions	1	8	4
Comments	At the end of the news article, Anita asked Alex one wh question (e.g. What do you think?) and provided him with at least 5-seconds of wait time to respond. Alex used aided communication to respond (great book). That was the only communicative turn taken by the student during the reading activity.	Brooke asked 8 WH questions and provided at least 5 seconds of wait time on 2 occasions. However, when Brianna would give an unintelligible response, Brooke would change the question to a yes/no format. On three occasions, Brooke provided a verbal language recast. No wait time was given following the recasts. Aided communication was not used during the activity.	While Cassie occasionally asked WH questions, she would only allow a few seconds for Cole to respond before changing the open-ended question to a yes/no question. Cole verbally answered yes to one question, and then used head nods/shakes to answer the other questions. Aided communication was not used by either Cassie or Cole.

Note. SGD= Speech generative device, ALI= Aided language input, EA= Educational assistant
*The number of occurrences for each language facilitation strategy that was used was recorded.

interaction steps correctly implemented by the EA on each page of the article and the percentage of grammatical morphemes produced by the student). The researcher also used a checklist (see Appendix F) to identify the EAs' use of AAC language facilitation strategies prior to instruction (see Table 4). Each communication dyad remained in baseline for a minimum of three probe sessions, or until there was stability in the primary dependent variable (i.e. the percentage of interaction strategy steps correctly implemented by the EA during the reading activity), with no indication of an increasing trend (McReynolds & Kearns, 1983). Feedback was not given during any baseline session.

Instruction and Intervention

This phase was twofold: (a) instruction consisted of teaching the EA participants to use the adapted RAAP! interaction strategy and (b) intervention consisted of examining the impacts of the communication partner instruction on the expressive language outcomes of the student participants (Binger et al., 2010; Douglas et al., 2012). News-2-You™ articles were used for both components of this phase.

Instruction content. During EA instruction, the researcher provided one-on-one coaching to teach the EAs the adapted RAAP! strategy (Binger et al., 2010), as well as provided hands-on practice with the students' AAC systems. The adapted RAAP! interaction strategy (see Appendix G) included: Read and provide aided AAC models of grammatical morphemes, Ask a wh-question to provide the student with an opportunity to use the inflection, Answer the wh-question with a recast, and Prompt using an operational cue (e.g. The dog IS [say "hold"] BARKING). The EA was instructed to use the interaction strategy on each page of the news article. Additionally, the target vocabulary (e.g. grammatical morphemes) was highlighted on each page of the

Table 5. Comparison of the Original RAAP! Interaction Strategy to the Adapted RAAP! Strategy

	Original RAAP! Strategy	*Adapted RAAP! Strategy*
Language Target	two -word utterances	grammatical morphology
R	Read + Model 2 words	Read + Model grammar inflection
A	Ask wh question (wait at least 5 seconds)	Ask wh question (wait at least 5 seconds)
A	Answer with a recast (wait at least 5 seconds)	Answer with a recast (wait at least 5 seconds)
P	Verbal Prompt ("show me two") + aided language model (wait at least 5 seconds)	Verbal Prompt ("hold") + aided language model of grammar inflection (wait at least 5 seconds)

newspaper to remind the EA to provide the aided AAC model. Questions designed to elicit grammatical morphemes were written at the bottom of each page (see Appendix C).

As previously noted, aided AAC models and recasts demonstrating the use of grammatical inflections have been suggested to facilitate the production of bound morpheme use in young children (Binger et al., 2011). During the prompting component step of the interaction strategy (i.e. "P" of RAAP!), the EA provided operational support by verbalizing the "hold" action required to elicit the inflection popups. In doing so, the EA was not only addressing linguistic skills required for effective and efficient communication, but also operational skills that are required for AAC system use (Light, 1989). Using an adapted protocol (Binger et al, 2010), the EAs conducted the following steps:

1. Read text and provide aided AAC models using the grammar support function of the AAC system (i.e. provide a grammatically complete

spoken model, and use a grammatical morpheme on the student's AAC system);

2. Ask a wh-question that should elicit the target grammatical morpheme production, and provide at least 5 seconds of wait time for the student to respond; if the student produces an incorrect answer or language form (e.g. dog/dogs), the EA will;
3. Answer the wh-question with a recast using an aided AAC model (e.g. yes there are two DOGS) and provide at least 5 seconds of wait time for the student to comprehend and respond;
4. Prompt the student using an operational cue (e.g. there are two [say, "hold"] DOGS) while using an aided AAC model, and provide at least 5 seconds of wait time.

Instruction format. The framework for teaching the EAs to use the interaction strategy was modeled after Kent-Walsh and McNaughton's (2005) 8-step ImPAACT program for communication partner instruction. The teaching protocol (see Appendix H) consisted of the following steps: (1) conducted pretest (e.g. baseline data probes), provided a general overview of AAC, and obtained EA commitment to training and strategy use, (2) administered an AAC operational competency checklist to EAs, and described the adapted RAAP! strategy, (3) demonstrated the strategy, (4) provided verbal practice for the steps in the interaction strategy (see Appendix F), (5) controlled practice with feedback using role-play, (6) controlled practice without feedback using role-play, (7) advanced practice with their student (e.g. maintenance), (8) completed a posttest, and (9) demonstrated maintenance of the strategy (Kent-Walsh & McNaughton, 2005).

Unlike previous ImPAACT studies (see Kent-Walsh et al., 2015 for review), the study did not assess generalization with a novel set of articles, but instead evaluated the EAs' ability to maintain the strategy use following the intervention. Based on the recommendations for future research in a study completed by Binger and colleagues (2010), the study included a brief overview of the students SGD to include a mini lesson on vocabulary arrangement, navigation, and programming. This additional information was introduced during the first coaching session, and readdressed as needed in subsequent training sessions.

Steps 1-5 were completed during a single coaching session, lasting approximately 90 minutes. Training included a PowerPoint presentation with video exemplars, visuals aids, and hands on instruction with the student's AAC system. During the second coaching session (approximately 30 minutes), the researcher reviewed the adapted RAAP! mnemonic and participated in a mock reading session while jointly planning for strategy use with the student. The EA also completed an oral self-reflection after the mock reading session, and received feedback from the researcher until the EA was able to independently implement the strategy with at least 90% accuracy for the duration of one news article. All of the EAs advanced to step 7 (e.g. intervention) when they met criterion.

Intervention. The intervention phase, during which data was collected on the dependent measures, mirrored those procedures used in baseline, with the addition of the interaction strategy. Each communication dyad participated in a reading activity using a News-2-You™ article. Sessions occurred twice weekly. During the first session of the week, the researcher provided the EA with a novel News-2-You™ article that contained

the selected linguistic targets for their student. The same article was used during both weekly sessions to decrease the cognitive load of the reading task. The EAs were instructed to use the adapted RAAP! strategy while providing grammar support using the students' SGD.

After the first dyad completed one week of intervention, the EA in the second dyad began the training protocol. Intervention sessions continued for the duration of the study (i.e. 8 weeks). The phases of the study continued to be staggered in this manner to provide for experimental control.

Maintenance

During the maintenance phase, the communication dyads participated in a reading activity using a novel, current News-2-You™ article that was selected by the researcher. Data was collected on all dependent variables in the same manner as in the intervention phase. Maintenance probes were obtained approximately two weeks after the intervention phase.

Data Analysis/Measures

The independent variable was the EA instruction program that was modeled after Kent-Walsh and McNaughton's (2005) partner instruction program. Data was collected for the two dependent variables. The primary dependent variable was the percentage of interaction strategy steps correctly implemented by the EAs during the reading activity. The student outcome measure included the percentage of grammatical morphemes produced by the student during the reading activity. Data collected on the EA and student variables were graphed and visually inspected for level, trend, and variability (Byiers, Reichle, & Symons, 2012).

Data Collection/Coding

All baseline, intervention, and maintenance sessions were videotaped using a Flip™ video camera. The researcher used the videos to collect data on both dependent variables following the guidelines set forth by Binger and Light (2008). For the EA measure, the percentage of steps correctly implemented within each session was calculated. A "step" included each part of the adapted RAAP! strategy, including the expectant delay between each step of the mnemonic (see Appendix I). Each step was recorded as correctly implemented, incorrectly implemented, or omitted. The percentage of steps correctly implemented was divided by the total number of steps for each page.

The student data were measured by calculating the percentage of spontaneous, grammatically correct target morphemes produced by the student during each reading session. As operationally defined by Binger and colleagues (2010), all grammatically correct target morphemes produced by the student before the prompt component of the interaction strategy counted towards the DV (i.e. "P" step of RAAP).

Visual analysis of data. Visual analysis of the data was used to examine the causal relationship between the independent variable and dependent variables. A treatment effect, and the magnitude of the relationship, can be determined by visual inspection of data across all phases of the study for at least three standards (Kratochwill et al., 2010). Researchers describe these standards, or effect features as: (1) level, (2) trend, (3) variability, (4) immediacy of the effect, (5) overlap, and (6) consistency of the data patterns across similar phases. This study focused on examination of level, trend, and variability as recommended by Byiers et al. (2012). Level, which represents the mean score of the data, was calculated by adding the values of all the data points in each

phase (i.e. baseline, intervention, maintenance) and dividing the sum by the total number of data points. Trend was determined by obtaining slope values for each phase to inspect for significant upward or downward trends. That is, a notable difference was observed between the slope of the line that connects the average of the first and the second half of data points in each phase. Finally, variability was calculated using the range of data in each phase. The researcher then compared the variability between conditions (i.e. baseline and intervention).

To further examine the clinical significance of the changes that occurred following the EA training, effect sizes were calculated based on standard mean difference (Cohen's *d*). In other words, the difference between the average baseline and the average intervention was calculated and then divided by a standard, frequently the standard deviation (Busk & Serlin, 1992).

Interrater/Coding Reliability

Inter-rater reliability was calculated on 10% of randomly selected sessions. The second rater consisted of a graduate research assistant enrolled in a communication sciences and disorders graduate program. The rater was trained by the lead researcher to identify and quantify the dependent variables. An independent samples *t*-test was utilized to examine agreement and it was found that no significant differences existed between raters, $t(73) = -.142$, $p = .159$. There was also a statistically significant positive Pearson correlation between the accuracy measures of each observer, $r = .990$, $p = < .001$. Both of these values indicate high levels of inter-rater reliability.

Procedural Fidelity

Procedural fidelity of EA instruction was assessed to ensure the researcher's adherence to the adapted version of Kent-Walsh and McNaughton's (2005)

communication partner instruction program. The evaluator who completed the fidelity checklist was a licensed and credentialed SLP with more than ten years' experience serving individuals with complex communication needs. The evaluator watched the complete instruction sequence (i.e. steps 1-6) for dyads 1 and 3 and completed the evaluation form (see Appendix J). She recorded a (+) if the step was correctly implemented, a (-), if the step was incorrectly implemented, and an (O) if the instructor omitted a step. She also provided written examples of evidence from the training to further support her decision. Procedural reliability for dyads 1 and 3 was 100%.

Social Validity

Two measures of social validity were obtained to determine the perceived impact of the intervention for two key stakeholders: (i.e. EAs and teachers). First, the EAs completed a training evaluation questionnaire (see Appendix B) to discuss their perceived benefits and challenges of the instructional program. Next, the classroom teacher for each student watched two randomly selected video clips, one from baseline, and one from intervention. The teacher was then asked to complete a questionnaire, which in part asked them to choose a preferred video and to explain why they selected that video (see Appendix B). The researcher used an online true random number generator to randomly assign the videos.

Chapter IV

RESULTS

This study investigated the effects of a communication partner instruction program on the educational assistants' ability to modify their interaction patterns during a curriculum based reading activity.

Visual and effect size analyses were conducted on the accuracy proportions that were obtained from the EAs and student participants. Visual inspection focused on level, trend, and variability as recommended by Byiers et al. (2012). In regards to effect size analyses, as recommended by Maas and Farinella (2012) effect sizes of 1.0 were established as the minimum d_2 that could be considered clinically relevant. In other words, the change in accuracy from pretreatment to posttreatment had to exceed the pooled standard deviation to satisfy this requirement.

Participant Analysis

EA Participant Analysis (See Figure 1)

Visual analysis of the EA data revealed differences in level between the baseline and both the treatment and maintenance phases. The phase change line between baseline and intervention represent the timing of the two EA training sessions. The EAs obtained a mean accuracy proportion of 4% during the baseline sessions whereas they obtained a mean accuracy proportion of 95.21% during the treatment phases and 91.33% during the maintenance phase. Visual inspection indicated that this change occurred immediately after implementing the intervention phase and there is no overlap between the phases, meaning that the data point representing the lowest accuracy proportion in the treatment

phase is still higher than the data point representing the highest accuracy proportion during the baseline phase. No differences in level were observed between the treatment and maintenance phase.

Visual inspection revealed no significant differences in terms of trend between the baseline and treatment phases. Statistical analysis concurred and revealed no significant difference between the slope values obtained during the baseline phase (m = -.025) or the treatment phase (m = .049); $t(2)$ = .041, p = .97. Inspection of the maintenance phase revealed a possible change in trend, with an 8.77% mean decrease in performance occurring immediately after the treatment phase.

Finally, visual inspection revealed changes in variability. The baseline condition was associated with floor effects and minimal variability (range = 8 percentage points) whereas more variability was observed during the treatment conditions (range = 28 percentage points).

Effect sizes based on standard mean difference were calculated to assess differences in baseline to posttreatment performance for each participant (Busk & Serlin, 1992). These values are reported in Table 6. Effect sizes for each participant exceeded 1 and were thus, determined to be clinically significant (Maas & Farinella, 2012).

*Student Participant Analysis (*See Figure 2*)*

Visual analysis of the participant data revealed differences in level between the baseline and both the treatment and maintenance phases. The participants obtained a mean accuracy proportion of 1.67% during the baseline sessions whereas they obtained a

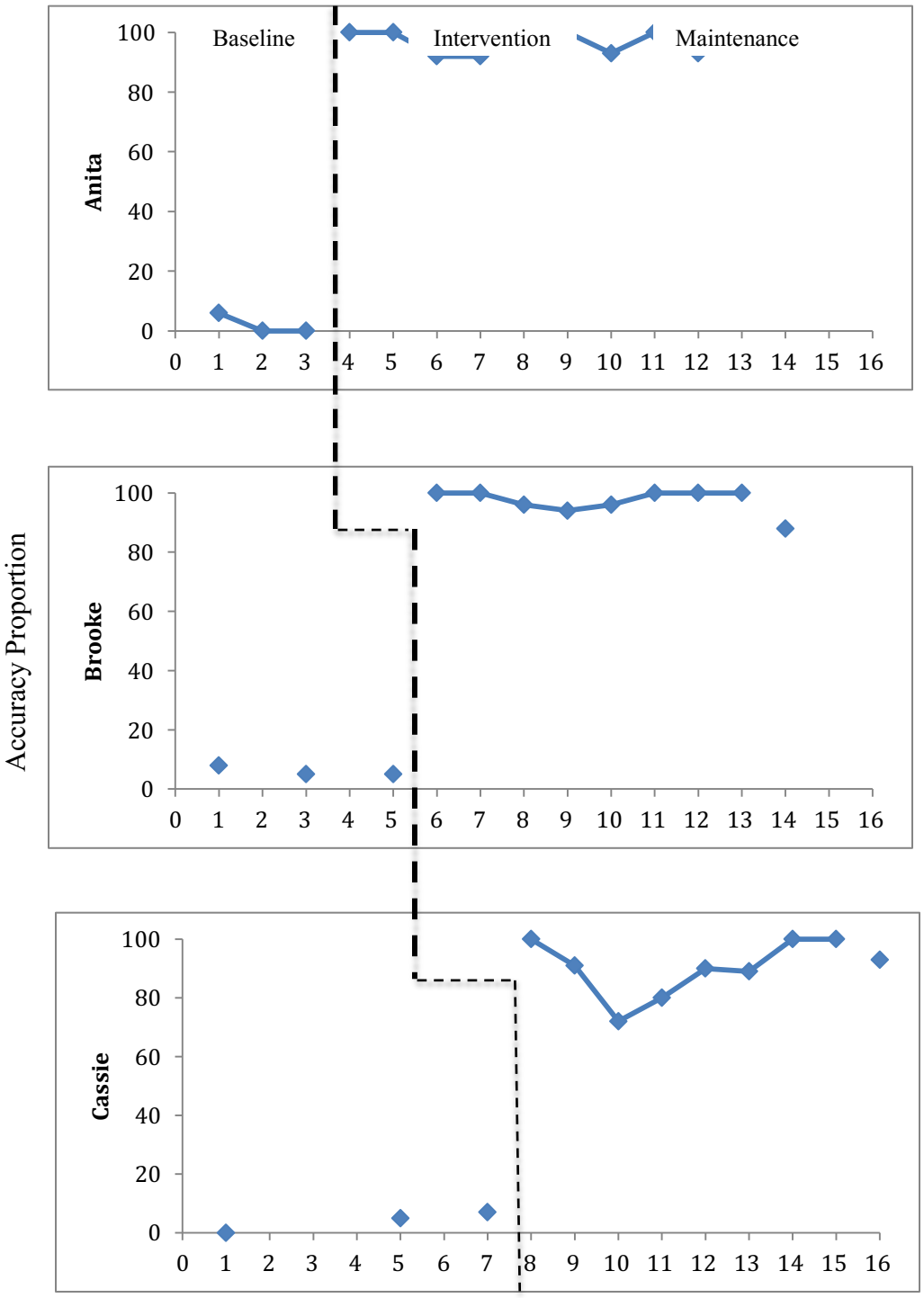

Figure 1. Percentage of EAs' Accurate Implementation of the Adapted RAAP! Strategy

Table 6. Means and Standard Deviations of EA Intervention Components

EA	Baseline, M (SD)	Treatment, M (SD)	Change	d_2
Anita	2 (3.46)	96.67 (3.97)	94.67	27.36
Brooke	6 (1.73)	97.11 (4.14)	91.11	52.66
Cassie	4 (3.61)	90.56 (9.57)	86.56	23.98

mean accuracy proportion of 84.79% during the treatment phases and 86% during the maintenance phase. No differences were observed between the treatment and maintenance phase. Visual inspection indicated that the change occurred immediately after implementing the intervention phase and there is no overlap between the phases, meaning that the data point representing the lowest accuracy proportion in the treatment phase is still higher than the data point representing the highest accuracy proportion during the baseline phase.

Visual inspection revealed no significant differences in terms of trend between the baseline and treatment phases. Statistical analysis concurred and revealed no significant difference between the slope values obtained during the baseline phase (m = -.333) or the treatment phase (m = .46); $t(2)$ = .44, p = .67. Inspection of the maintenance phase revealed a possible change in trend, with a 13.33% mean decrease in performance occurring immediately after the treatment phase.

Finally, visual inspection revealed changes in variability. The baseline condition was associated with minimal variability (range = 9 percentage points) whereas more

variability was observed during the treatment conditions (range = 62 percentage points). Effect sizes based on standard mean difference were calculated to assess differences in baseline to posttreatment performance for each participant (Busk & Serlin, 1992). These values are reported in Table 7. Effect sizes for each participant exceeded 1 and were thus, determined to be clinically significant (Maas & Farinella, 2012).

Table 7. Means and Standard Deviations of Student Intervention Components

Student	Baseline, M (SD)	Treatment, M (SD)	Change	d_2
Alex	0 (0)	96.63 (5.77)	96.63	96.63
Brianna	6 (1.73)	80.50 (18.98)	74.5	43.06
Cole	4 (3.61)	77.25 (19.46)	73.25	20.29

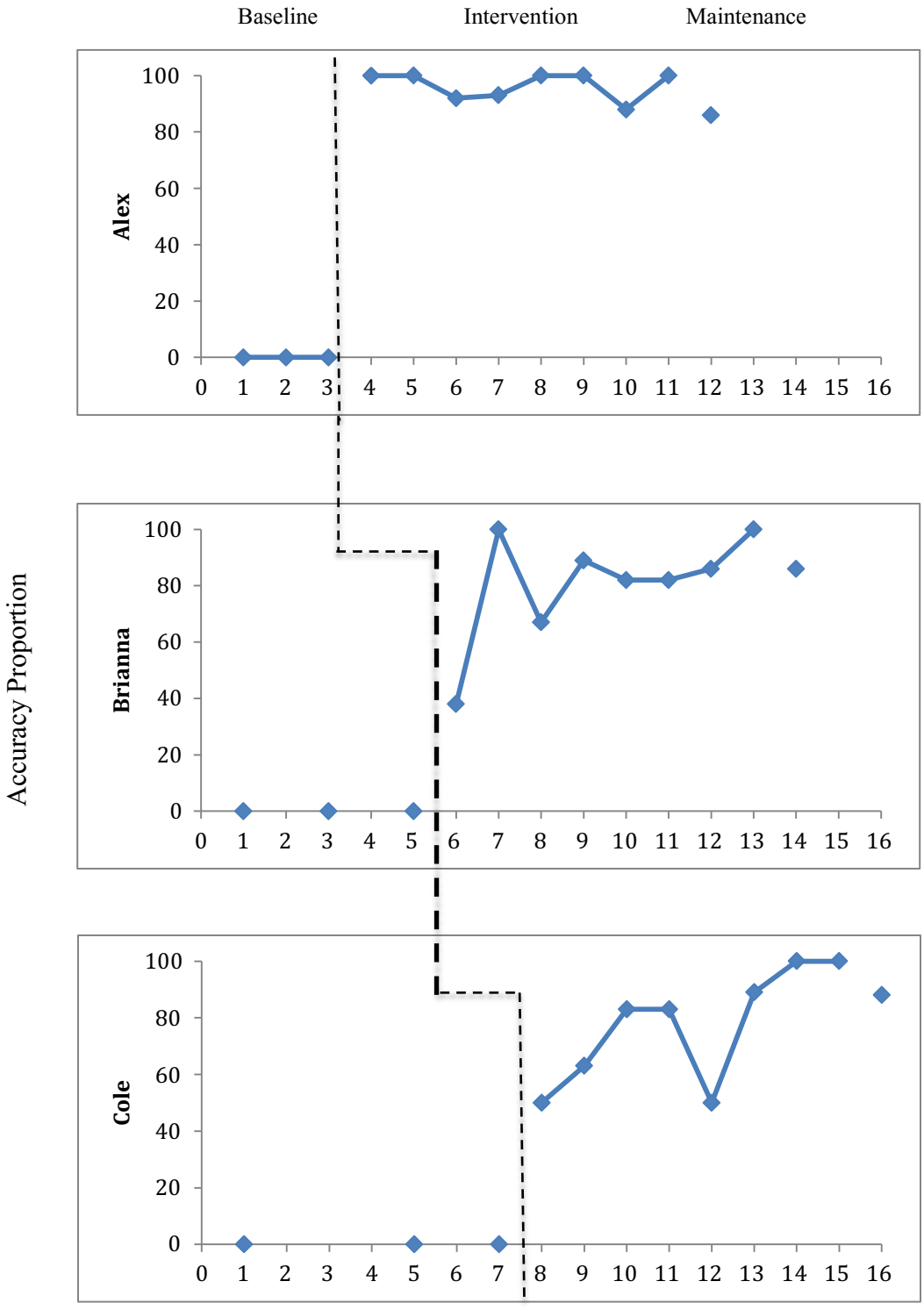

Figure 2. Percentage of Students' Accurate Production of Targeted Grammatical Morphemes

Social Validation

Educational Assistant Questionnaire

Social validity data was collected and assessed to ensure that key communication partners valued the intervention (Schlosser, 1999). On the social validity questionnaire (see Appendix L), all participating educational assistants reported positive changes in the language and communication skills of the student that they worked with. They also indicated that they would recommend the training program to other EAs. Additionally, the EAs provided comments about the benefits and challenges of the training. Please see Appendix B for a summary of the EAs' comments.

Teacher Questionnaire

As a second measure of social validity, the classroom teachers that worked with each EA reviewed the randomly assigned video from pre- and post-instruction. After watching the two video clips, the teachers completed a questionnaire (see Appendix B) that asked them to select the video in which they believed the EA provided the best communication support for the student. They were also asked to select the video that represented their preferred communication interaction between the EA and the student. Two of the three teachers selected the post-instruction video for both questions. When asked what they liked or valued about the student's communication behaviors in the selected video clip the responses included: (1) the student appeared to take pride in having more of an opportunity to participate and communicate, (2) the student was able to add more to the conversation, (3) the student was more engaged and used her device more for communication, and (4) I like how the student was able to practice grammatical skills with the device which were modeled for her by the EA . Additionally, the teachers

noted the following in reference to the EA communication behaviors: (1) I loved how the EA incorporated assistive technology during the reading and responses to instruction and (2) I like how she modeled for the student how to use the device as she was reading, in order to teach the student how to efficiently use the device to communicate during instruction.

One teacher chose the pre-training video for both questions. When asked to discuss the reasons why she selected the video clip she noted: (1) the EA had more of a conversation with the student and the student seemed to be more engaged in the lesson when the communication device was not used, (2) the student used his communication skills (e.g. talking to the EA) more when he was not relying on the device, and (3) the EA seemed to ask more questions and have dialogue with the student when the device was not used in the lesson.

Chapter V

CONCLUSION

The purpose of this study was to determine what effects a communication partner training program would have on the grammatical morphology skills of adolescent students who require AAC. Results indicate that the intervention was effective at increasing the educational assistants' (EAs) use of the interaction strategy (e.g. RAAP), as well as the students' use of grammatical morphemes. This study also provides initial evidence that an intervention package with components of communication partner instruction, aided AAC modeling, contingent responsivity, and operational cues can be an effective, efficient, and socially valid AAC intervention for this population.

Effectiveness of Instructional Program to Increase Targeted Strategy Use

The present investigation utilized a multicomponent intervention based on research and available scholarship in the areas of communication partner instruction, AAC modeling, and grammatical morphology interventions (e.g. contingent responsivity). More specifically, the Improving Partner Applications of Augmentative Communication Techniques (ImPAACT) program (Binger et al., 2010; Kent-Walsh, et al., 2010; Kent-Walsh, et al., 2015) was used as a framework to guide the design and implementation of the training program for the EAs. The 2.5-hour training utilized five main instructional techniques that have been shown to support long-term communication needs of individuals who require AAC: (a) video review, (b) modeling, (c) role-play, (d) verbal rehearsal, and

(e) coached practice (Kent-Walsh et al., 2015). Results of the study indicate that all of the EAs improved their ability to effectively implement the Read-Ask- Answer-Prompt (RAAP!) strategy immediately following the training program.

During baseline, the EAs implemented the interaction strategy with accuracy levels that fluctuated between 0% and 8%. After participating in the one-on-one training, all of the EAs were able to implement the target strategy during the first intervention session with 100% fidelity. Possible factors that contributed to the initial high gains in EA performance include familiarity with the reading material (e.g. news article) and general practice effects. The news article that was used by all of the EAs for the first and second intervention sessions was also used during the strategy instruction and controlled practice sections steps of the training protocol (see Appendix I). Additionally, all three adolescent students demonstrated significant increases in the number of grammatical morphemes that they produced. Both EA and student gains were maintained approximately two weeks following the end of the intervention phase. Study results support the hypothesis that training the EAs would lead to an increased use of the adapted RAAP! interaction strategy.

Comparisons to Results of Past Communication Partner Research

Previous communication partner research found large effects for outcomes that measured communication partners' (e.g. parents, peers, EAs) use of fidelity of strategy instruction implementation (Shire & Jones, 2015). Additionally, communication partner instruction has consistently resulted in positive gains for young children across language domains including semantics (e.g. vocabulary), pragmatics (e.g. turn-taking), syntax (e.g. multi-symbol utterance), and morphology (e.g. bound morphemes) (Kent-Walsh et al., 2015).

The current study supported these findings, but also added vital information regarding these findings with an adolescent population. A meta-analysis of communication partner research conducted by Kent-Walsh and colleagues in 2015 identified very large overall effect sizes for all identified age categories, except adolescents (e.g. 12-17 years of age), which yielded no effect (IRD=0). The results of the current study provides initial evidence that training communication partners for an adolescent population of individuals can produce large effects and should continue to be viewed as an integral part of AAC interventions.

Effects of Strategy Use on the Students' Grammatical Morpheme Productions

There is research evidence to support the impact of adult speech, specifically contingent responsivity, on language learning (Hoff, 2006). To expand further, this investigation targeted the language domain of morphology in the form of increased productions of grammatical morphemes during an academic based reading activity. Study results support the second research hypothesis that the EAs' use of the targeted interaction strategy (e.g. RAAP!) would lead to an increase in the students' expressive use of grammatical morphology. Implications of these findings are consistent with past research, which examined the effects of using AAC modeling, recasting, and contrastive targets on the grammar skills of young children who used AAC (Binger et al., 2011).

Strategy Instruction Model

The present study also provides evidence indicating that EAs can be taught to employ a series of communication skills within a specified sequence (e.g. RAAP). In the baseline phase of this study, the EAs rarely used evidence-based language facilitation strategies (e.g. AAC modeling, open-ended questions + wait time, recasts) (see Table 4).

Additionally, there were limited communication opportunities provided for the students, which perhaps limited communication turns taken by the students. Research in the field of AAC suggests that these non-facilitative communication exchanges (e.g. adult dominate conversations) may be a common occurrence with communication partners of individuals who use AAC. Communication partner instruction was developed as a possible solution to train partners to use language facilitative strategies.

In the current investigation, immediate gains in expressive language outcomes were noted once the EAs began using the language facilitation strategies. For example, during the first intervention session, Brianna produced the targeted grammatical morphemes with 38% accuracy and Cole demonstrated an accuracy of 50%. Interestingly, Alex correctly produced all of the grammatical morphemes with 100% accuracy in the first intervention session. The significant gains made by Alex may have been due to his literacy skills, or as a result of having the opportunity (open-ended question + expectant delay) to demonstrate his expressive language abilities. Since Brianna and Cole cannot read, they had to learn the motor plan (e.g. position) for each grammar inflection symbol on their device before they could correctly express the grammar target, whereas, Alex had the capability to read each grammar form. Future research is needed to fully understand the impact that literacy skills have on the acquisition of morphology for individuals who use AAC.

Overall, the training taught the EAs to use evidence-based language facilitation strategies, which increased the quality of communication, so that language learning could occur. Specifically, the EAs were taught to use the skills of wh-question asking, expectant delay, contingent responding, aided AAC modeling, and verbal prompting as the use of the skills resulted in positive child language gains in prior research (Binger et al., 2010).

Aided AAC Modeling

The core skill of the interaction strategy was aided AAC modeling, which developed out of the social learning theory (Tomasello, 2003). According to this hypothesis of language acquisition, children acquire early language skills, rather seamlessly, as a direct result of the linguistic input they receive from their communication environment. Research further indicates that the language learning process for individuals who use AAC may differ significantly. For example, individuals who use AAC typically receive language input in the form of speech, and not in the symbolic form of their communication system. This is a challenge for AAC users because they are expected to use a mode of communication that is not modeled for them. Smith and Grove (2003) refer to this opportunity barrier as an "asymmetry between the modalities of input to output" (p. 163). AAC modeling based interventions were developed as a possible solution to this asymmetry (Binger & Light, 2007; Caifero, 2001; Drager et al., 2006; Goossens', 1989). The results of the present study indicate that the EAs' provision of aided AAC models led to student gains in the areas of linguistic (e.g. production of grammatical morphemes) and operational (e.g. ability to access grammar inflections) competence.

The frequency at which the EAs provided the aided models in this study ranged from 21-28 models per news article. Therefore, the students received at least two aided AAC models per minute. Previous research in the area of aided AAC modeling reported similar doses of input, providing around 30 AAC models in 15 minutes (Binger & Light, 2007). However, this remains a stark contrast to the quantity of linguistic input that typically developing children receive which ranges from 620-2,150 words per hour (Hart & Risely, 1995). Despite the relatively low doses of quality input, the students made

meaningful communication gains.

It is important to note that this intervention took place in the context of an academic based literacy activity, which provided multiple communication opportunities at the students' current level of development. Additionally, the communication displays (see Appendix C) that were created for each news article provided easy access for the EA to provide aided modeling, and for the student to communicate Research has found that contingent responses are most effective at increasing language and communication outcomes when they are matched to the developmental level of the child (Yoder & Warren, 1998). Therefore, the researcher administered the PPVT-4 (Dunn & Dunn, 2007) as a measure of receptive vocabulary prior to intervention in order to identify developmentally appropriate language targets. Each student's resulting age equivalency was then matched to a developmentally appropriate stage of grammatical development using Brown's order of grammatical acquisition (1973). Therefore, student gains following an increase in the EAs' use of the interaction strategy may be a result of the grammatical morphemes targets being in the students' ideal language learning zone.

When discussing grammar interventions for individuals who use AAC, it is critical to consider the intrinsic and extrinsic factors that may affect the results. Intrinsic factors include a student's cognition, receptive language abilities, memory and attention skills, whereas extrinsic factors are related to issues with the communication partner or AAC system. Previous findings to this effect (Binger et al., 2008; Binger, et al, 2011, Binger & Light, 2007) may help explain the varying rate of acquisition of the target grammar structures for the three student participants. While the EA training was designed to decrease the impact of the extrinsic factors related to the communication partners and grammar

accessibility of the student's AAC system, the heterogeneity of the student profiles may still contribute to the expressive grammar challenges.

Implications of Findings

The findings of this study have both clinical and educational implications. A significant increase in strategy use by the EAs was found to result in significant expressive grammar gains in their students who require AAC. This study provides preliminary evidence that a training program that follows the ImPAACT framework for partner instruction can lead to effective interventions provided by EAs during an academic based reading activity. Although previous studies have demonstrated the positive effects of training EAs who support young children with CCN (Binger et al.,2010; Binger et al, 2011), the current results indicate that training appears to be as effective with an adolescent population of students. Furthermore, the length of time that the adolescent participants experienced an ineffective style of communication did not appear to influence the need for a longer or more intense intervention. In other words, the dosage of the intervention of the present investigation was consistent with the dosage of previous research (see Kent-Walsh et al., 2015). Given the potential for well-trained EAs to positively impact the expressive grammar and communication skills of students who require AAC, local educational agencies should consider making systematic training a high priority.

The demonstrated positive effects on student grammatical morphology use is also consistent with prior research with students who use aided communication (Binger et al., 2011). The students exhibited communication gains when the EAs began to provide language input (e.g. AAC modeling) in a way that matched their expressive

communication. Additionally, results of this study provide support for selecting expressive grammar interventions that incorporate the use of contrastive targets (e.g. past tense verbs and present progressive tense verbs), recasts, and AAC modeling. This study also provides support for the integration of skills and instruction across the domains of communication and literacy for an adolescent population of students. The goal of a shared reading activity in AAC is not to assess comprehension of reading material, but to promote opportunities for communication that facilitate language development in a natural setting. In summary, SLPs should continue to incorporate recognized frameworks (e.g. ImPAACT program, strategy instruction) into AAC intervention protocols in order to expand service delivery to include key stakeholders.

Limitations

Although this investigation provides evidence to support the effectiveness of a communication partner training program, several limitations should be considered and possibly accounted for in future research. First, although typical of similar research, the current sample size was small (i.e. 3-dyads) and based on a structured convenience sample procedure. The student participant profiles are limited in relation to age, disability category, language and literacy ability levels. Therefore, like most single-subject designs, the external validity of the results cannot be determined without replication

The multifaceted nature of the training components (e.g. role-play, verbal rehearsal, strategy demonstration) is also a limitation, as the impact of each component on the EAs' ability to use the interaction strategy cannot be determined. Furthermore, the packaged interaction strategy (e.g. RAAP!) makes it difficult to discern the impact of

each strategy component (e.g. AAC modeling, and recasts) on the students' acquisition of grammatical morphology. A final limitation of this study relates to the context and setting of the intervention. Since the present study examined the effects of an interaction strategy during the context of a one-on-one reading activity outside of the classroom, the degree to which the effects would be maintained in other contexts (e.g. leisure, vocational) or settings (e.g. classroom, community) are unknown. While past studies using the ImPAACT framework for communication partner instruction (Binger et al.,2008; Binger et al., 2010; Kent-Walsh et al., 2010) included a generalization phase to examine the communication partners abilities to implement the target strategy in a novel context or setting, the time allotted in the present study did not allow for this phase. Taken collectively, the limitations of this study provide avenues for future research.

Recommendations for Future Research

The results of this investigation suggest that the AAC intervention was effective with an adolescent population of students in the context of a reading activity. Replications of the methods presented in this study would add to the external validity of the results. As recommended by one of the EAs on the social validity questionnaire, future research should also examine the effectiveness of the intervention in the classroom setting to determine if possible variables exist, which might affect the EAs' instructional gains, or the students' communication gains. Although the results of this study are in alignment with prior research in the area of communication partner instruction in AAC, modifications specific to an adolescent population of students continue to be a critical need. When considering the adolescent participants and the important role that peers play during this stage of development, future research should expand to include a variety of

communication partners such as peers. Furthermore, carryover of communicative competencies into the community is the ultimate goal of AAC interventions for adolescent and adult populations. Therefore, research should examine the impact of communication partner and strategy instruction frameworks across a range of settings (e.g. jobs, leisure activities with peers).

Conclusions

While future research is needed to examine the effects of providing communication partner instruction to key stakeholders for an adolescent population of students, this research begins to fill a gap with a previously underrepresented population of individuals who use AAC. Many adolescent students who require AAC experience limited achievement of language and literacy skills (Smith, 2015), however, the results of this study support the notion that limited attainment should not lead to abandonment of these goals. It is encouraging to note that this study provides preliminary evidence that supports the provision of AAC interventions to increase communication partner skills that facilitate the grammatical morphology skills of adolescents who use aided communication.

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Appendix A

Institutional Review Board Approval Letter

Appendix A

Institutional Review Board Approval Letter

Institutional Review Board (IRB)
for the Protection of Human Research Participants

VALD•osTA STATE

EXPEDITED PROTOCOL APPROVAL

PROTOCOL NUMBER: IRB-03567-2017

RESPONSIBLE RESEARCHER: Hallie Eckdahl
SUPERVISING FACULTY: Dr. Matt Carter

PROJECT TITLE: *Teaching Educational Assistants to Facilitate Grammatical Morphology in Adolescents who use AAC.*

APPROVAL DATE: 01.18.2018

EXPIRATION DATE: 01.17.2019

LEVEL OF RISK: Minimal O More than Minimal

TYPE OF REVIEW: Expedited Under categories 6 & 7 O Convened (Full Board)

CONSENT REQUIREMENTS:
Adult Participants-Written informed consent with documentation (signature)
O Adult Participants-Written informed consent with waiver of documentation (signature)
O Adult Participants-Verbal informed consent
O Adult Participants-Waiver of informed consent
Minor Participants-Written parent/guardian permission with documentation (signature)
O Minor Participants-Written parent/guardian permission with waiver of documentation (signature)
O Minor Participants-Verbal parent/guardian permission
O Minor Participants -Waiver of parent/guardian permission
O Minor Participants – Written assent with documentation (signature)
Minor Participants-Written assent with waiver of documentation (signature)
O Minor Participants-Verbal assent
O Minor Participants-Waiver of assent
O Waiver of some elements of consent/permission/assent

APPROVAL: This research protocol is approved as presented. If applicable, your approved consent form(s), bearing the IRB approval stamp and protocol expiration date, will be mailed to you via campus mail or U.S. Postal Service unless you have made other arrangements with the IRB Administrator. Please use the stamped consent document(s) as your copy master(s). Once you duplicate the consent form(s), you may begin participant recruitment. Please see Attachment 1 for additional important information for researchers.

COMMENTS:

Elizabeth Ann Olphie, IRB Administrator Date

Thank you for submitting an IRB application.
Please direct questions to irb@valdosta.edu or 229-259-5045.

Form Revised: 05.02.15

Appendix B

Social Validity Measures and Results

Appendix B

Social Validity Measures and Results

Training Evaluation Form (Educational Assistant)

Name: _____

Date: _____

1. What were some of the benefits of this training program?

_____

_____

_____

2. What were some of the challenges of this training program?

_____

_____

_____

3. Is there anything that you would change about the training?

_____

_____

_____

4. Did you notice any changes in the language or communication skills of the student that you support? **Yes** **No**

If you answered **Yes**, what changes did you notice?

_____

_____

_____

5. Would you recommend this training program to other educational assistants?

Why or why not?

_____

_____

_____

6. Do you have any other comments, or suggestions?

_____

_____

_____

Training Evaluation Form (Teacher)

Teacher's Name: _____ Dyad: _____

Date: _____

1. In which video do you believe that the EA provided the best communication support for the student? **A** or **B**

2. Which video represents your preferred communication interaction between the EA and student? **A** or **B**

3. Why did you choose the selected video (i.e. discuss the differences in EA and student communication/behaviors and associated value/impact)?

_____

_____

_____

_____

_____

_____

_____

_____

_____

Summary of Comments Indicated on EA Training Form

1. What were some benefits of this training program?

Benefits for students

- Opportunity to practice language skills
- Opportunity to increase the student's language knowledge
- Opportunity to put learned vocabulary into sentences that are just not one word at a time

Benefits for EAs who support student with CCN

- I gained a greater level of familiarity with Proloquo and learned new strategies for assisting students using this program.
- It gave me a much better insight to the program and how it works
- Very user friendly for students and staff

2. What are some of the challenges with this training program?

- I wish I had access to the program at home and had a bit longer to familiarize myself with the device
- I think the training program overall was good.
- I think it might be difficult to transition this in to a classroom setting that isn't one-to-one
- At first it was hard to memorize the RAAP method of steps
- In the beginning of this training, I would have the tendency to skip a step, but towards the end it became easier to follow all the steps.

3. Is there anything that you would change about the training program?

- All EAs responded "no"

4. What changes did you notice in the language or communication skills of the student that you support?

- He was reading more than when we started
- The student made more attempts to verbally add "s" when speaking about plural objects during the program
- At the beginning, he would use the AAC device (to respond) and as time went on, he would read with the story
- The student was able to recognize and use the proper tense after seeing it used

5. Would you recommend this training program to other EAs? Why or Why not?

- Yes, this program encourages/allows for easier communication
- Sure, I think it would be beneficial even if just for exposure to assistive technology.
- Yes, I really enjoyed working with my student as a paraprofessional. We work with these students, but no really one-on-one with reading on the iPad doing the RAAP program

6. Do you have any other comments or suggestions?

- I think this program gave me more insight as to what challenges a student who uses augmentative communication has to struggle with. I think the RAAP technique for learning is so wonderful. I loved to see how my student would light up when he would read and realize that he could and was learning more every week.

Appendix C

News-2-You™ Articles and Communication Display

Appendix C

News-2-You™ Articles and Communication Display

News-2-You™ Articles used in each phase

	Baseline	Instruction/Intervention	Maintenance
Dyad 1	*Winter X Games* *Super Bowl Sunday* *Amazing Musician*	*Rock Painting Fun* *All Stars Are 100!* *Baby Gorilla* *Kindness Week*	*King Tut*
Dyad 2	*Winter X Games* *Hot Air Balloon Festival* *Habitat For Humanity*	*Rock Painting Fun* *Amazing Musician* *Baby Gorilla* *Kindness Week*	*King Tut*
Dyad 3	*Winter X Games* *Super Bowl Sunday* *Dog Sport Championship*	*Rock Painting Fun* *School Football Games* *Amazing Athletes* *Baby Gorilla*	*King Tut*

news -2- you

Volume XX, Edition 1 | n2y.com | August 21, 2017

WHAT

?

ROCK PAINTING FUN !

People are having fun with rocks !

These people are called rockers.

A rocker paints small rocks.

The rocker hides the painted rocks outdoors.

RAAP!

Q: What does the rocker hide outdoors? (WAIT)

RAAP!
Read
Ask ?
Answer
Prompt "HOLD"

news page

Other  people  find  the painted rocks. 

The painted rocks  are a fun  surprise. 

The painted rocks  can make  people  happy. 

Rock  painting  is popular  now. 

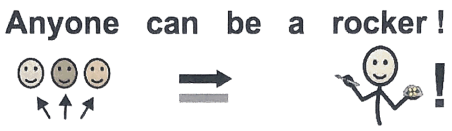
Being a rocker  is easy  and fun  !

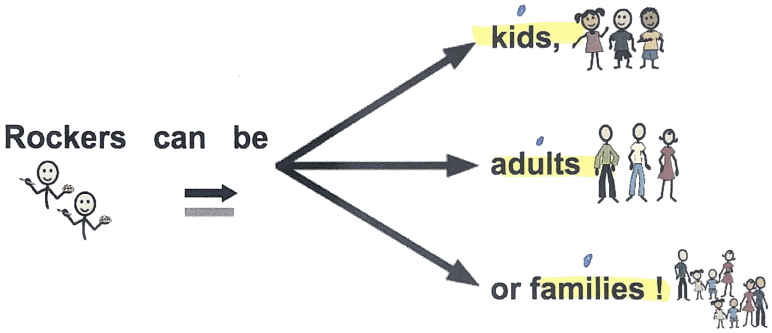
RAAP!

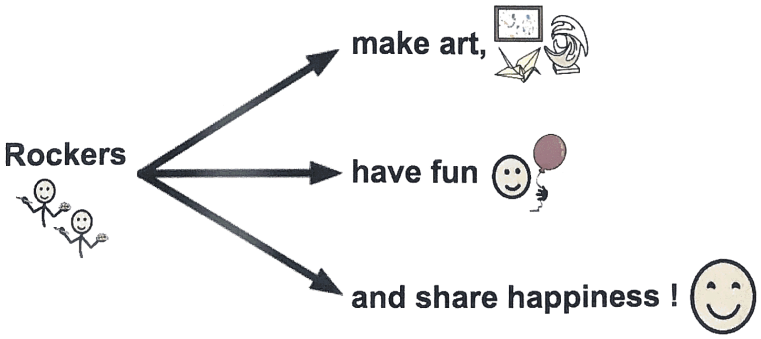
Q: What is popular now? (WAIT)

RAAP!
Read
Ask ?
Answer
Prompt "HOLD"

news page







RAAP!

Q: Who can be rockers? (WAIT)

RAAP!
Read
Ask ?
Answer
Prompt "HOLD"

news page

You can be a rocker too !

Find small rocks outdoors.

Paint the rocks.

You can paint

- designs,
- animals,
- flowers,
- words And It The WORDS Up
- and more.

RAAP!

Q: What can you paint on rocks?
(WAIT)

RAAP!
Read
Ask ?
Answer
Prompt "HOLD"

news page

Then hide the painted rocks outdoors.

Hide the painted rocks where people can find them.

Hide painted rocks

- in a park,
- under a bench,
- on a beach,
- beside a tree
- or in your yard !

RAAP!

Q: What do you hide outdoors?
(WAIT)

RAAP!
Read
Ask ?
Answer
Prompt "HOLD"

news page

You can post painted rock pictures online.

You can follow your painted rocks online too.

This week's News-2-You craft tells you how. *

The craft helps you become a rocker.

Then you can share happiness too !

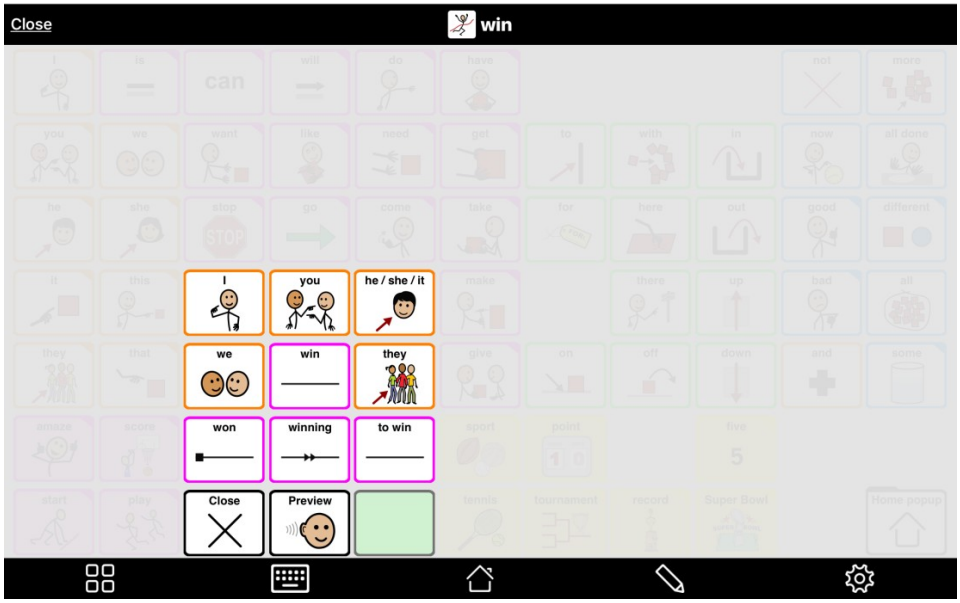
*** Look for the craft in the News-2-You Activities at n2y.com.**

RAAP!

Q: What can you post online?
(WAIT)

RAAP!
Read
Ask ?
Answer
Prompt "HOLD"


Close
Amazing Athletes
I
is
can
will
do
have
not
more
you
we
want
like
need
get
to
with
in
now
all done
he
she
stop
STOP
go
come
take
for
FOR
here
out
good
different
it
this
see
look
put
make
there
up
bad
all
they
that
think
know
say
give
on
off
down
and
some
amaze
score
help
win
athlete
sport
point
1 0
five
5
start
play
throw
champi-onship
tennis
tournament
record
Super Bowl
SUPER BOWL
Home popup


Close
win
I
you
he / she / it
we
win
they
won
winning
to win
Close
Preview

Appendix D

Data Collection Forms

Appendix D

Data Collection Forms

Implementation Score Sheet

EA Participant:_____ Student Participant:_____

Date:_____ News Article:_____

Page __ (The RAAP strategy is used for each page of the article) (+)=Correct (-)=Incorrect (O)=Omitted

Read	**Reads** material_____ **& Models** correct inflection(s) ____/____=____ 1		***Student Imitation: (not counted in %)**
Level 1 Ask	**Asks** the question_____ Wait time (5 sec) _____ 2	***Student Response:** S=Symbolic V=Verbal Moves to **next page** if correct response/linguistic form is provided _____ *Incorrectly moved to next page **after no response*** _____	
Level 2 Answer -following NO response	Moves to **Answer** if no response_____	**Answers** question with aided AAC model _____ Wait time (5 sec)_____ 3 ***Answers** question **without** inflection model*_____ ***Answers** question with **incorrect** inflection model*_____	***Student Response:** S=Symbolic V=Verbal Moves to **next page** if correct response/linguistic form is provided_____ *Incorrectly moved to next page **after no response***_____
Level 2 Answer -following **incorrect** response/linguist form	Moves to **Answer question with recast** if student provides an incorrect response, or a response with an incorrect linguistic form_____	**Answers with a recast** using inflection model _____ Wait time (5 sec)_____ 3 ***Provides a recast without** inflection model*_____ ***Provides a recast** with **incorrect** inflection model*_____	***Student Response:** S=Symbolic V=Verbal Moves to **next page** if correct response/linguistic form is provided_____ *Incorrectly moved to next page **after no response***_____
Level 3 Prompt	Moves to **Prompt** if no response or incorrect linguistic form_____	**Prompts** for correct response/linguistic form:_____ 4 • Operational prompt (e.g. "hold") **Models** correct response/linguistic form_____ Wait Time (5 sec)_____ 5	***Student Response: (not counted in %)** Moves to **next page**____

EA-Total number of steps correctly implemented/Total number of steps: _____/_____=_____%

Student- Level needed for student success: 1 2 3

Number of correctly produced grammatical morphemes **before** Level 3: _____

Implementation Score Sheet

EA Participant:_____ **Student Participant:**_____

Date:_____ **News Article:**_____

***Weekly Session *1* or *2*

EA-Total number of steps correctly implemented/Total number of steps:

Page Number	Total number of steps correctly implemented	Total number of steps
1		
2		
3		
4		
5		
6		
7		
8		
9		
Total		

____/_____=_____%

Student-Number grammatical morphemes produced before the verbal prompt

Page Number	Grammatical morphemes	Level needed for student success
1		
2		
3		
4		
5		
6		
7		
8		
9		
Total		How to calculate average/median/mode_____

Appendix E

Participant Demographic Questionnaires

Appendix E

Participant Demographic Questionnaires

Educational Assistant Demographic Questionnaire

*Answers to all questions are voluntary. You may choose to skip a question, or not provide an answer.

Name:

_____

Prefer not to answer

What is your age?

18-23

24-29

30-45

46-55

55+

Prefer not to answer

What is your gender?

Female Male Prefer not to answer

Which ethnicity best describes you? Select all that apply.

White

Black or African American

American Indian or Alaska Native

Native Hawaiian or Pacific Islander

Other _____

Prefer not to answer

Do you have any known current speech, language, or hearing impairments?

Yes

No

Prefer not to answer

Place of employment:_____

Prefer not to answer

How long have you worked in a Life Skills/Special Education classroom?

0-5 years

5-10 years

10-20 years

20+ years

Prefer not to answer

How many years have you supported students who use AAC?

0-5 years

5-10 years

10-20 years

20+ years

Prefer not to answer

What is your highest level of education achieved?

High School/GED

Some College

Associate's Degree

Bachelor's Degree

Graduate Degree

Other_____

Prefer not to answer

Student Demographic Questionnaire

*Answers to all questions are voluntary. You may choose to skip a question, or not provide an answer.

Student's name:

_____

What is your child's age? _____

Prefer not to answer

What is your child's gender?

Female Male Prefer not to answer

Which ethnicity best describes your child? Select all that apply.

White

Black or African American

American Indian or Alaska Native

Native Hawaiian or Pacific Islander

Other _____

Prefer not to answer

Disability: (Please list any information regarding the student's primary and/or secondary disabilities, including hearing, vision, motor, and/or cognitive).

_____

_____

Prefer not to answer

Please list all the ways in which your child communicates (For example, facial expressions, pointing, speech, speech generative device, objects, picture symbols, sign, etc):

_____

_____

Prefer not to answer

If your child uses a speech generative device, what are they currently using and how long have they used it?

Device Name:_____ Unsure of device name

0-2 years

2-5 years

5-8 years

8-10 years

10+ years

Prefer not to answer, or not sure how long they have used the device

Name of person completing this form:_____

Relationship to the student:_____

Appendix F

Communication Partner Observation Tool

Appendix F

Communication Partner Observation Tool

Communication Partner Observational Tool

Name: _____ **Date:** _____

(+) observed (-) not observed

Best practices to facilitate communication	**Session 1-Baseline**	**Session 2-Instruction session with student**	**Session 3-Maintenance session**
Communication system provided			
Modeled language (ALI/ALS)			
Provided wait time (at least 5 sec) after question, or aided language model			
Expanded what student said (recast or expansion)			
Used open-ended questions			
Provided prompts as needed (least to most)			

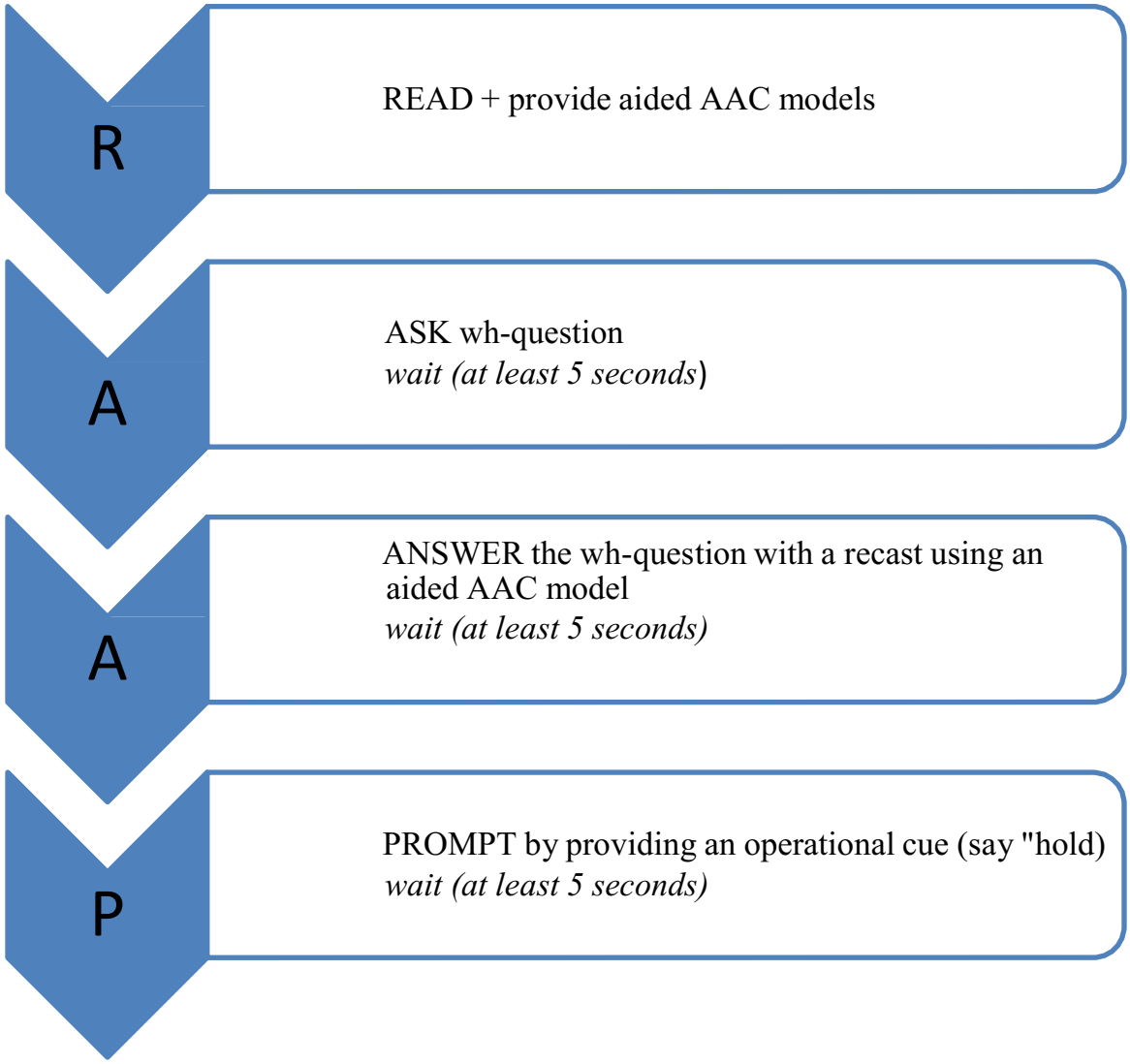
Operational competencies in PLQ	**Session 1-Instruction phase**
Turn device on/off	
Turn volume up/down	
Turn on/off guided access	
Change user	
Locate target vocabulary	
chair	
on	
dog	
what	
you	
Access grammar inflections	
Going (present progressive tense verb)	
Sees (third person singular verb)	
Went (irregular past tense verb)	
Helped (regular past tense verb)	
Birds (plural)	

Appendix G

Visual Aid for Target Interaction Strategy

Appendix G

Visual Aid for Target Interaction Strategy



Adapted from: Binger, C., Kent-Walsh, J., Ewing, C., & Taylor, S. (2010).

Appendix H

EA Training Program

Appendix H

EA Training Program

Steps and Procedures for the EA Training Program

Step	*Procedures*
1. Pretest (baseline), AAC overview, & obtain commitment to the training program (Training session 1)	R:Provide general overview of AAC. Review common characteristics of individuals who uses AAC, as well as common characteristics of their communication partners R: Show the EA two video clips: one with the researcher using the interaction strategy, and one without the use of the interaction strategy. Discuss differences in student and instructor communication behaviors R & EA: Review and sign contract (see Appendix K) to commit to completing the training and to using the adapted RAAP strategy
2. AAC operational competency baseline and instruction, & Strategy Description (Training session 1)	R: Administer operational competencies checklist to EA R: Provide instruction on AAC system use, vocabulary display, basic programming, core vocabulary, use of grammar inflections, and aided language input (ALI) R: Describe each RAAP! strategy step and provide a visual aid depicting each step
3. Strategy Demonstration (Modeling) (Training session 1)	R & EA: Model the use of the strategy with the R assuming the role of the instructor during a News-2-You reading activity. The R will use "think-aloud" statements to promote an errorless learning approach
4. Verbal practice of strategy steps (Training session 1)	R & EA: Using the mnemonic visual aide, will verbally repeat the RAAP! steps to memorize the strategy: *Read, Ask, Answer with recast, Prompt with operational cue.* R & EA 5 times, EA 5 times, R 5 times, EA 5 times
5. Controlled practice and feedback (Training session 1/2)	R & EA: Demonstrate the use of the interaction strategy in a controlled environment using role-play. The EA will assume the role of the instructor and the R will assume the role of the student. The R will provide varying scenarios to provide the EA with multiple practice opportunities R: Provide ongoing feedback and answer questions

	with gradual fading of prompts
6. Controlled practice without feedback (Training session 1/2)	R & EA: Role-play without feedback. The EA will assume the role of the instructor and the R will continue the role of the student. The R will provide varying degrees of difficulty as the student. The EA must be able to implement the strategy steps with at least 90% accuracy to move to advanced practice
7. Advanced practice and feedback (Training Session 2/Intervention session 1)	EA: Independently practice using the RAAP! strategy with their student during a live, shared reading activity in a quiet room outside of the classroom R: Video record session and collect data on dependent variables R: Provide feedback and answer questions. R & EA: Review and plan for future strategy use with student
8. Posttest (Intervention sessions 2-8)	EA: Will independently use the RAAP! strategy during selected reading activities with their student in a quiet room outside of the classroom. R: Video record sessions and collect data on dependent variables; Will not provide any prompting or feedback
9. Maintenance and commitment to long-term strategy use (Maintenance session-1)	R: Will provide the EA with a novel News-2-You™ article EA: Will independently use the RAAP! strategy during selected reading activity with their student in a quiet room outside of the classroom R: Video record session and collect data on dependent variables; Will not provide any prompting or feedback EA: Complete training evaluation form

R = Researcher; EA = Educational Assistant

Adapted from: Kent-Walsh, J., Binger, C. , & Malani, M. D. (2010). Teaching partners to support the communication skills of young children who use AAC: Lessons from the ImPAACT program. *Early Childhood Services, 4* (3), 155-170.

Appendix I

Implementation Sequence for Target Interaction Strategy

Appendix I

Implementation Sequence for Target Interaction Strategy

Implementation of RAAP, RAAP, RAAP!

On each page of the news article, the EA should:

READ the text and provide aided AAC models using the grammar support function of the AAC system (i.e. provide a grammatically complete spoken model, and use a grammatical morpheme on the student's AAC system)

ASK a Wh- question to provide an opportunity for the student to produce a grammatical morpheme.

PAUSE (at least 5 sec, or until the student produces a message)

If the student produces an incorrect language form (e.g. dog/dogs), the EA will:

ANSWER the wh-question with a recast using an aided AAC model (e.g. "there are two dogs" DOGS)

PAUSE (at least 5 sec, or until the student produces a message)

If the student produces an incorrect language form (e.g. dog/dogs), the EA will:

PROMPT by providing an operational cue (e.g. There are two [say "hold"] DOGS?).

PAUSE (at least 5 sec, or until the student produces a message)

If the student produces the correct language form after the question is asked, or after the recast or prompt, then the EA will continue to the next page of the article.

Adapted from : Binger, C. , Kent-Walsh, J. , Ewing, C. , & Taylor, S. (2010).

Appendix J

Fidelity Checklist

Appendix J

Fidelity Checklist

APPENDIX

Procedural Reliability of EA Training Program

Name of Evaluator: Jade Robinson, Ph.D., CCC-SLP Date: August 31, 2018 Dyad: EA1

Step	*Session Number*	*Procedure*	*(+)=Correct (-)=Incorrect (O)=Omitted*	*Examples of Evidence from Day 1 Training*	*Examples of Evidence from Day 2 Training*
1. Pretest (baseline), AAC overview, & Commitment	1	R: Provide general overview of AAC. Review common characteristics of individuals who uses AAC, as well as common characteristics of their communication partners.	⊕ - O	~05:50 R explained the complexity of symbol learning	
		R: Show the EA two video clips: one with the researcher using the interaction strategy, and one without the use of the interaction strategy. Discuss differences in student and instructor communication behaviors.	⊕ - O	~11:10 R Shared video example 1 w/o strategy use; ~14:40 Shared example 2 w/ strategies	
		R & EA: Review and sign contract to commit to completing the training and to using the adapted RAAP strategy	⊕ - O	~28:00 Contract provided and signed by EA	

2. AAC operational competency baseline **aod instruction**, & Strategy Description	I	R: Administer operational competencies checklist to EA	*(!)* - O	-30:00 EA demonstrated op. **competencies**
		R: Provide instruction on AAC system use, vocabulary display, basic programming, **core vocabulary, use of grammar** inflections, and aided language input (ALI).	O O	*-45:00* R gave clear explanations for using guided access and editing P2Go
		R: Describe each RAAP! strategy step and provide a visual aid depicting each step.	O O	-5300 Flip book provided to EA
3. Strategy Demonstration (Modeling)	I	R & EA: Model the use of the strategy with the R assuming the role of the instructor during a News-2-You reading activity. The R will usc "think-aloud" statements to **promote an errorless learning approach.**	<:) - O	–1:15:00 R demonstrated strategies during a N2Y activity
4. Verbal rehearsal of strategy steps	1	R & EA: Using the mnemonic visual aide, will verbally repeat the RAAP! Steps to memorize the strategy: Read, Ask, Answer, Prompt.	(!) - O	-1:13:00 **Mnemonic** introduced
5. Controlled practice with feedback (Role-Play)	1/2	R & EA: Demonstrate the use of the interaction strategy in a controlled environment using role-play. The EA will assume the role of the instructor and the R will assume the role of the student. The R	(!) - O	– 1:23:00 EA demonstrated strategies during a N2Y activity

		will provide varying scenarios to provide the EA with multiple practice opportunities. R: Provide ongoing feedback and answer questions with gradual fading of prompts.	⊕ - O		Day 2, Part A ~9:00 Practice with feedback
6. Controlled practice without feedback	1/2	R & EA: Role-play without feedback. The EA will assume the role of the instructor and the R will continue the role of the student. The R will provide varying degrees of difficulty as the student. The EA must be able to implement the strategy steps with at least 90% accuracy to move to advanced practice. (See attached score sheet) **In between days 1 & 2, the R & EA will review strategy steps and the R will provide additional controlled practice if necessary. R & EA will then resume the training sequence.*	⊕ - O + - O		Day 2, Part A ~18:30 Independent practice *Perhaps this was completed, but not captured on video*
7. Advanced practice and feedback	2	EA: Independently practice using the RAAP! strategy with their student during a live, shared reading activity in a quiet room outside of the classroom. R: Video record session and collect data on dependent variables	⊕ - O ⊕ - O		Day 2, Part B ~6 minutes of video

		R: Provide feedback and answer questions. R & EA: Review and plan for future strategy use with student.	⊕ - O ⊕ - O		Day 2, Part C Throughout session Day 2, Part C ~1:10 Example of thinking through areas that may be more challenging for student during future sessions

APPENDIX K

Instructional Program Contract

Appendix K

Instructional Program Contract

Formal Agreement to Completing Instruction

This agreement formally outlines all instructional activities that you will be participating in.

The following five main instructional techniques will be used during your training:

- Video review
- Modeling
- Role-play with constructive feedback
- Verbal rehearsal
- Coached practice

The RAAP! instructional sequence that you will be learning stands for READ, ASK, ANSWER, PROMPT.

This is an interaction strategy that you will use with your student while you participate in a joint reading activity using a curricular-based news article.

TRAINING: The length of time for individual sessions can vary. Some communication partners may feel comfortable and demonstrate "mastery" within 1-2 sessions. Others may require up to 5 hours of total instructional time across 3 or more sessions.

In step 5 of the instructional sequence you will be asked to independently use the RAAP! strategy during a role play session. If you are able to use the interaction strategy with at least 90% accuracy, you will move on to the advanced practice step during which you will begin working with your student. If you don't reach mastery of the strategy in step 5, you will be offered additional training so that you can feel comfortable and confident in your ability to use this strategy.

If you agree to this training and use of the RAAP! interaction strategy, please sign and date below.

_____ _____

Signature of Communication Partner Date