11-22-2009

Teaching a school-based AAC team to support the communication skills of a student who requires AAC

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BY

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B.A. SPEECH AND HEARING SCIENCES,
UNIVERSITY OF NEW MEXICO, 2007

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Science

Speech Language Pathology

The University of New Mexico
Albuquerque, New Mexico

July, 2009

DEDICATION

I would like to dedicate this thesis to my children. Education is important, but learning something new each day is priceless!

ACKNOWLEDGMENTS

I gratefully acknowledge Dr. Cathy Binger, my advisor and thesis chair, for knowing the words to say to keep me going and for believing in me. Her passion for providing every person a voice will stay with me throughout my career.

I also thank my committee members, Dr. Sandy Nettleton and Dr. Barbara Rodriguez, for their guidance, encouragement, and chocolate.

To the AAC team at Zia Elementary School for allowing me to come into your classrooms and adjusting your schedules to meet my needs.

To the AAC lab team for their expertise with transcription and reliability. This group of ladies provided an invaluable piece to this document, and great smiles along the way.

To my family and friends, you encouraged me and believed in me even when I didn't believe in myself. You prayed for me and offered me endless support through this journey.

And finally, to my husband, Mark and our children, Austin, Savana, and Kayla, you have accomplished as much as I have through this experience, and I love you very much!

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ABSTRACT

Many children of all ages are in need of augmentative and alternative communication (AAC). Adult communication partners in the school setting typically interact differently with children who use AAC than they do with others. In prior studies, an eight-step instructional program designed to teach adult communication partners to facilitate the communication skills of students who use AAC has been used within an individual instructional format. The eight-step instructional model used to teach these adults has been shown to be effective; however, research is required to establish the efficacy of this program when providing instruction to adult communication partners within group settings. In the current study, the eight-step model was used to instruct one school-based AAC team within group settings. Results indicated that group instruction was an effective and efficient way to teach the AAC team a cueing hierarchy to facilitate the child's communication skills; every adult increased his or her accurate use of the strategy, and results were statistically significant. However, generally speaking, the adults did demonstrate more errors than adults in prior studies who received instruction in one-on-one settings, indicating that more work needs to be done to ensure the effectiveness of providing instruction within group settings.

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Introduction and Review of Related Literature

Many children of all ages are in need of augmentative and alternative communication (AAC). In the school setting, these children interact with communication partners who typically lack the skills to initiate and maintain optimal communication with them. In fact, the interactions between adults and children who use AAC tend to be, in some ways, inherently different from interactions with others. For example, when interacting with a child who uses AAC, adults tend to use the following interaction patterns: predominantly ask yes/no questions instead of WH- or open-ended questions (Light, Collier, & Parnes, 1985 a & b); use only speech instead of providing an aided AAC model (i.e., using the child's device as well as speech; Binger & Light, 2007); fail to expect a response instead of expecting the child to participate by providing an expectant delay (Kent-Walsh, 2003); use verbal prompts that are too lengthy and/or too frequent, thus pre-empting opportunities for communication (Binger, Kent-Walsh, Berens, del Campo, & Rivera, 2008); and respond infrequently (Houghton, Bronicki, & Guess, 1987) instead of responding contingently to each of the child's communicative acts (Bailey, Simeonsson, Yoder, & Huntington, 1990; see Table 1).

Communication partners interacting with children who use AAC must be taught to overcome these tendencies and instead facilitate the communication skills of these children. There are multiple types of cues that can be used to facilitate communication outcomes for children who use AAC. The least intrusive cue is a natural cue; which consists of any type of prompt that might occur in the normal course of daily life that

Table 1

Adult Communication Behaviors with Children who use AAC

Typical Adult Behaviors	Facilitative Communication Behaviors
Using only speech when communicating with a child	Using aided AAC modeling (i.e., using the child's device as well as speech; Binger & Light, 2007)
Asking yes/no questions (Light et al. 1985 a & b)	Asking WH questions (e.g., Binger et al., 2008)
Failing to expect a response	Expecting children to participate by providing an expectant delay (Kent-Walsh, 2003)
Using verbal prompts that are too lengthy and/or too frequent	Providing a brief verbal prompt and/or using a least-to-most cueing hierarchy (Binger et al., 2008)
Responding infrequently to children (Houghton et al. 1987)	Responding contingently to each of the children's communicative acts (Bailey et al., 1990)

indicates an opportunity to communicate. Natural cues take a wide variety of forms, both verbal and non-verbal. Examples of verbal cues include someone saying hello (which is a natural cue to respond by saying hello) or making a statement such as "I went to the movies last night" (which is a natural cue for the partner to ask the person a question about the movie). A non-verbal cue might consist of simple actions such as walking into a room (which is a natural cue for someone to say hello) or reaching out a hand (which is a natural cue to shake hands). It is critical to ensure that communication partners are aware of and are using natural cues, instead of pre-empting communication opportunities by immediately using other types of prompts (for example, direct verbal prompts such as, "Tell me 'hello'"; Light & Binger, 1998). While typically developing children learn to recognize these cues naturally, many children who use AAC need to be taught to

recognize natural cues (Halle, 1988). When children do not identify natural cues spontaneously, additional cues are needed to help these children learn how to recognize when they are expected to produce a target response.

Another type of cue is modeling, in which the teacher provides a demonstration of the communicative act to be performed. Modeling has been used extensively to teach target structures to children with language impairments (LI). A model provides a child with an example of exactly what the instructor is expecting. For children with LI who rely on speech to communicate, the instructor typically provides numerous verbal examples of the structure being taught (Paul, 2007). For example, if a child is learning to produce semantic-syntactic relations such as agent-action-object, the adult can provide many models of agent-action-object sentence structures (e.g., "Jimmy plays ball"). Through an extensive body of literature, modeling has been shown to be an important and effective tool for teaching new linguistic structures to children with LI (e.g., Connell, 1987; Leonard, 1975 a & b; Leonard, 1981; Fey, 1986). This technique has been adapted for individuals who use AAC. When providing a model for a child who uses AAC, the instructor uses the child's device to model the aided AAC messages that correspond to the spoken model that is provided (Binger & Light, 2007). For example, while reading a storybook, a communication partner can supply an aided AAC model by providing a spoken model, such as "Dora is flying with Diego," and then selecting symbols on the child's communication device, such as *DORA FLY DIEGO*. When adult communication partners provide an aided AAC model, they provide the student with real world meaning of the symbols that are on the device and provide a model, or demonstration, for how symbols can be used to communicate in various contexts and for various purposes. In

addition, aided AAC modeling shows the child that using an AAC device is an acceptable way to communicate (Romski & Sevdik, 1996; Goossens', 1989).

Another cue that has been studied in both the child language disorders and AAC literature is expectant delay (also known as time delay). With expectant delay cueing, the communication partner provides a pronounced pause in the conversation, typically accompanied by focused attention that includes eye contact and/or an expectant facial expression. This provides the opportunity and expectation for someone to take a turn in the conversation. Expectant delays during a conversation "cue individuals to communicate in reaction to environmental stimuli other than verbal prompts, and … create opportunities and reasons for individuals to use communication skills that are already in their repertoire" (Calculator, 2002, p.347). In research by Halle and colleagues (1981), teachers of children with moderate retardation and language delay were taught to provide an expectant delay during classroom activities (e.g., free play, snack time, and lunch time) to encourage the students to increase spontaneous requests. When the teachers used an expectant delay, the children initiated requests more frequently. Many children who use AAC also need to be given the opportunity and be expected to take a turn in a conversation (Kent-Walsh, 2003). Johnston and colleagues (2003) instructed teachers and typically developing preschoolers to provide cues, including expectant delays, to encourage their students who used AAC to produce specific targets (e.g., request entrance into playgroups, request the attention of others, or request continuation of an activity). The teachers and typically developing peers provided an expectant delay that cued the children who used AAC to produce his or her specific target. All of the children in this study increased his or her use of AAC for functional communication.

In addition to natural cues, models, and expectant delays, the communication partner may also use questions as a form of cueing. Asking questions to cue turn-taking in conversation is an integral part of learning to promote expressive language; asking questions other than yes/no questions prompts children to use a wide variety of vocabulary and syntactic structures. Venn and colleagues (1993) studied the effect of teaching preschool children to use non-yes/no questions with their peers with moderate to severe disabilities during snack time in order to increase the frequency of responses of the children with disabilities. The typically developing children were taught to ask non-yes/no questions and provided a time delay (e.g., "Which one do you want?" combined with a pause). If the child with disabilities responded, the typically developing child gave the requested snack (e.g., the cookie). Unfortunately, adult communication partners frequently use yes/no questions, instead of WH questions or other questions that elicit more content, when speaking with children who use AAC (Light et al., 1985 a & b). Light, Binger, and Kelford-Smith (1994) found that when mothers read storybooks to their children who required AAC, they asked predominantly factual yes/no questions and seldom asked open-ended or WH questions. This was understandable, as the children primarily used non-verbal means of communication (e.g., vocalizations, gestures, pointing); the children had access to yes/no responses (via, for example, head nods/shakes), but they had limited access to other symbolic means of communication. In other words, it may have been difficult for the children in the study to provide answers to questions that were more open-ended, because the children did not have had the ability to speak the words to provide answers to these types of questions. However, adults relying on yes/no questions when communicating with children who use AAC is problematic, in

that children must be exposed to WH questions to build more complex language skills (Parnell, Patterson, & Harding, 1984). If children who use AAC are not exposed to WH questions, their language development may not reach their fullest potential. In addition, teaching children who use AAC to appropriately respond to WH questions weighs heavily on how they will perform academically, linguistically, and socially (Parnell et al., 1984).

At times, more naturalistic cues such as expectant delays and WH questions may not elicit responses from the child; in these cases, direct verbal prompts may be used. A direct verbal prompt occurs when the instructor explicitly states that a behavior needs to occur. For example, Coe and colleagues (1990) taught three students with autism and/or mental retardation to interact with instructors during play activities. In this study, the instructor provided direct verbal prompts when more naturalistic cues (i.e., natural cue of a peer holding out his hands and expectant delay from peer and instructor) did not elicit the target behavior. For example, when the child did not throw the ball, the instructor said, “Throw the ball, John.” When a student has not picked up on natural cues, it can be beneficial for the instructor to explicitly tell him/her directly to complete the task. The same can be said for children who use AAC. Johnston and colleagues (2003) studied the effects of the cues that the adult communication partner provided within a least-to-most cueing hierarchy, which included direct verbal prompts, to increase the symbolic communication of preschoolers with significant developmental delays (DD) who used AAC. These students were provided with a series of cues during preschool activities, such as snack time or singing activities, in order to facilitate AAC or spoken responses. When communication partners had provided a series of cues and the child still did not

provide the desired response (e.g., the pre-programmed message, *I WANT TO TELL YOU SOMETHING*), the adult communication partner provided a direct verbal prompt (e.g., "push the button"). The use of this cueing hierarchy resulted in all three of the participants increasing their use of spontaneous symbolic communication (Johnston, McDonnell, Nelson, & Magnavito, 2003).

In addition to providing prompts to teach new linguistic structures, it is also important for partners to respond contingently to the child's productions of the target, in order to reinforce the child's use of the target. Various types of contingent responses, such as imitations, expansions and extensions, have long been studied with children with LI and DD. For example, Kaiser and colleagues (1996) studied the effectiveness of teaching parents of children with DD to use responsive interaction strategies, such as immediately responding to the child's correct responses by praising and expanding the child's response. When parents used these responsive interaction techniques, the children demonstrated positive changes in the targeted language (e.g., improving expressive grammar) and behavior objectives (e.g., throwing fewer temper tantrums). In another study, Nelson and colleagues (1996) instructed parents of children with and without LI to facilitate grammar skills by using expansions and extensions. These researchers found that consistently expanding and extending the child's responses, as opposed to imitating the child's responses, resulted in the children increasing their use of grammatical targets, such as modals and irregular past-tense verbs. Other studies also have shown that expansions and extensions may be used to increase a variety of expressive language targets, such as mean length utterance in a study of children with LI (Nelson, Camarata, & Welch et al., 1996) and the use of spontaneous utterances in a study of children with

autism (Charlop & Walsh, 1986). Children who use AAC, of course, also may benefit from adults responding contingently to their communicative acts. Researchers have argued that for children who use AAC, contingent responses should incorporate an aided AAC model. Kent-Walsh (2003) taught educational assistants to respond contingently and incorporate an aided AAC model for each communicative turn taken by the student during storybook reading activities. The adult communication partner incorporated the child's previous utterance into a contingent response while providing an aided AAC model. For example, if the child said, *CLIFFORD DOG* on his AAC device, the adult could provide an aided AAC model and expand the message by saying, "Yes, Clifford is a big dog," and selecting *CLIFFORD BIG DOG* on the device. Each of the students in this study demonstrated an increase their communicative turn-taking skills. In another study, Goossens' (1989) provided AAC instruction for a child who used gaze to communicate. In this study, every communicative message was expanded with an additional spoken word and the adult pointed to the symbol that the child selected. The child in this study dramatically increased her ability to use AAC communicatively after the communication partner provided a response to each of the child's communicative intents. It must be noted that the effect of using contingent responses was not isolated in these AAC studies; instead, contingent responding was one component of each program. Nevertheless, strong theoretical arguments and evidence from clinical cases provide support for the use of these types of cues when teaching new skills to children who use AAC.

The cues and responses discussed above – natural cues, expectant delays, WH questions, verbal prompts, and contingent responses – have most often been studied in

combination with one another. When provided in a specific order, they become a cueing hierarchy. A least-to-most cueing hierarchy is one type of hierarchy that is designed to help communication partners teach a child new skills by providing minimally intrusive prompts and progressing to more intrusive prompts until the child produces the target response (Fisher, Kodak, & Moore, 2007). Levels of the hierarchy are provided gradually, so that the child only receives increased levels of support as needed. This approach helps to prevent dependence on cues (Oppenheimer, Saunders, & Spradlin, 1993). Hart and Risley (1975) included all of the techniques discussed above (i.e., natural cue, expectant delay, WH question, prompt, and contingent response) in the milieu incidental teaching method. In this investigation, the clinician set up a situation in which an object the child wanted was placed out of reach. This provided a structured but naturalistic setting that gave the child a natural cue to produce a specific target (i.e., requesting the object). If the child did not produce the target after a brief pause, the clinician asked a WH question (i.e., "What do you want?") and provided another brief pause, giving the child an opportunity to respond. If the child did not respond, the clinician answered the question (i.e., "You want the crayons") and provided a brief pause, giving the child another opportunity to respond. If the child still did not answer, the clinician provided a direct verbal prompt instructing the child to produce the target (i.e., "Say, 'want crayon'") and provided a brief pause, giving the child another opportunity to respond, and then gave the child the desired item. If at any point during the communication exchange the child produced the target response (i.e., "Want crayon"), the clinician responded verbally (i.e., "You want the crayons"), thereby providing a contingent response (and, more specifically, an expansion) to the child's production. The

clinician then gave the child the desired item. This sequence of events – natural cue, expectant delay, WH question, prompt – is an example of a least-to-most cueing hierarchy.

This type of least-to-most cueing hierarchy was used by Hart and Risley (1975) to encourage children who have LI and who do not require AAC to produce targets in naturalistic preschool activities. Least-to-most cueing hierarchies have been adapted for use in studies of children who use AAC to communicate, including hierarchies that closely mirror that of Hart and Risley (e.g., Binger, Kent-Walsh, Ewing, & Taylor, submitted; Light & Binger, 1998; Johnston et al. 2003). For example, Binger and colleagues (submitted) used a cueing hierarchy nearly identical to that of Hart and Risley, with the exception of adding aided AAC modeling to most of the steps. That is, when the communication partners provided natural cues, WH questions and answers, and contingent responses, they provided these cues while modeling on the child's AAC device. For example, when asking a WH question, instead of simply saying, "What is Little Critter doing?" the adult also selected the symbols *WHAT LITTLE CRITTER* on the device. All three children participating in this study increased their use of symbol combinations following intervention.

Binger, Kent-Walsh and colleagues have used mnemonics to help adult communication partners (such as parents and educational assistants) memorize the steps of least-to-most cueing hierarchies. For example, these authors have used the RAA! (Kent-Walsh, 2003; Binger et al., 2008) and RAAP! (Binger et al., submitted) mnemonics to describe strategies and the cueing hierarchy that include the following steps within structured storybook reading activities: Read, Ask, and Answer, and, in the

case of RAAP!, a final verbal Prompt step. With these strategies, the adult communication partner was taught to: (1) Read a page (the natural cue) while providing an aided AAC model followed by an expectant delay; (2) Ask a question (specifically, a WH question) while providing an aided AAC model followed by an expectant delay; (3) Answer the question while providing an aided AAC model followed by an expectant delay; (4) in the case of RAAP!, provide a brief verbal prompt, such as "Your turn". Once the child produced a response, the communication partners were taught to respond contingently while providing an aided AAC model.

Kent-Walsh and McNaughton (2005), as well as other researchers (e.g., Light et al., 1994), have argued that it is critical to teach communication partners to use the types of cues and responses discussed above when interacting with children who use AAC. Many adults who interact with children who require AAC typically lack the skills required to effectively support the communication skills of these children (Light et al., 1985a), therefore, the adults must be explicitly taught how to do so. Because a child who uses AAC spends the majority of his or her day with parents and educators, these adult communication partners are the natural choice to implement these cueing hierarchies. Kent-Walsh and McNaughton (2005) argued that it is critical to provide systematic instruction when teaching adult communication partners how to facilitate the communication skills of children who use AAC. These researchers proposed using an eight-step learning program, originally developed by Ellis and colleagues (1991), when providing instruction to the communication partners of children who use AAC. In their original work, Ellis and his colleagues described an eight-step program to teach learning strategies to students with learning disabilities to help these students improve their

performance in academic and nonacademic situations. The stages (or steps) of the program include the following: (1) pretest and make commitments, (2) describe the strategy, (3) model the strategy, (4) verbal practice of the strategy, (5) practice the strategy in controlled settings with feedback, (6) practice the strategy in an advanced settings, (7) posttest and make future commitments, and (8) generalization of the strategy. These eight steps are described in detail below.

The first step of the program is the "pretest and make commitments step." The purpose of this step is to identify how students approach an educational demand and commit to learning new strategies that may help them do so. In this step, the students in Ellis et al. (1991) were tested to determine their use of the strategy being taught prior to instruction and commit to learn the strategy. In this case, the students were taught to use a strategy that was designed to help them to gain more information when reading complex materials. Gersten and colleagues (1997) suggested that when learners are introduced to the new skills for which they will be instructed, they are more successful in implementing them.

The purpose of Step 2, the "describe step," was for the instructor to describe the process involved in learning the new strategy, how the strategy could help the student with academic tasks, show how the strategy was different from how the student typically approached academic tasks, and develop motivation for learning the strategy. The instructor described the strategy (i.e., stated when, where, and how the strategy should be used) and provided a first letter mnemonic device to help the students remember the strategy's steps and set goals for learning the strategy (Ellis, Deshler, Lenz, Schumaker, & Clark, 1991). For example, the students in Deschler and Schumaker (2005) were taught

to use the ASK IT! strategy, a “Self-Questioning” strategy, in which the students read a passage, formulated questions relating to predictions about what would happen next in the text, and answered the questions by reading further in the text. The self-questioning ASK IT! strategy included the following steps: Attend to clues as you read, Say some questions, Keep predictions in mind, Identify the answers, and Talk about the answers. In this step, the instructors also provided an opportunity for the student and instructor to talk about how the strategy steps could help them complete certain tasks. It has been suggested that if a learning strategy is not perceived by the student to be relevant, it is likely that the student will not use it (Gersten, Morrant, & Bregehman, 1995).

Step 3 is the model step. The purpose of this step was for the instructor to provide examples of the strategy and demonstrate how the students could use think-aloud statements in order to enhance their understanding of the strategy and learn the strategy efficiently. A think-aloud statement is a way to provide verbal modeling of how and when to use each step of the strategy being taught. For example, when teaching a student to comprehend reading materials, the instructor might say, “Whenever I am going to read new information, the first thing I think is, ‘Attend to the clues as I read.’ This means that I look for details.” The teacher demonstrates the strategy from beginning to end using these think-aloud statements (Ellis et al., 1991). During this step, the students become increasingly actively involved in using the strategy being taught. The instructor provides support for the student to learn how to self-monitor and take ownership of the strategy.

In Step 4, verbal practice, students are taught to practice saying the steps of the strategy to assist with memorization and to help the children become more automatic when recalling the strategy steps, so their attention can be placed on the implementation

of the strategy in different situations (Carter & Maxwell, 1998; Ellis et al., 1991). For example, the students in Deschler and Schumaker's (2005) study verbally repeated the strategy steps of the ASK IT! strategy until they reached verbal mastery to help them commit the strategy steps to memory: "Attend to clues as you read, Say some questions, Keep predictions in mind, Identify the answers, and Talk about the answers."

The fifth step is controlled practice and feedback. The purpose of this step is to provide students with multiple opportunities to practice the strategy without the distractions of real-life situations and allow them to build confidence with using the strategy. During the first part of this step, the instructor guides the student through practice activities. For example, in Ellis et al. (1991), the instructor guided the student through activities such as complex vocabulary or extensive reading passages in a quiet setting (i.e., without the distractions of the regular classroom), so that the student could focus on the specific steps of the strategy. In the second part of this step, after the student demonstrates mastery with the strategy, the student uses the strategy independently, with feedback provided by the instructor as needed. For example, in Ellis et al., while the student completed practice assignments relatively independently, the instructor provided feedback and answered the student's questions as needed. Gersten, Vaughn, Deshler, & Clark (1997) suggested that without this practice and feedback, students will be inconsistent in their strategy implementation.

Advanced practice is the sixth step. The purpose of this step is to allow the students to have additional practice with the strategy in a more natural context with the distractions of real-life situations while still receiving feedback from the instructor. The instructor provides feedback as needed and fades the feedback as the student

demonstrates further mastery in these more realistic settings (Deshler & Schumaker, 2005). In this step, focus "shifts from learning how to perform the strategy to apply the strategy to meet the various *real* demands typically found in the criterion environment" (Ellis et al., 1991, p. 17). Once students achieve mastery in controlled practice (i.e., in Step 5), the instructor provides guidance and feedback while the student practices guided and independent activities that more closely resemble real-world activities. For example, in Ellis et al. (1991), the instructors provided assignments that were more consistent with their classroom work and that included more complex vocabulary and extensive reading passages within the regular classroom setting.

The seventh step is the posttest and make commitments stage. The purpose of this step is to document the students' application of the strategy without feedback from the instructor. In this step, the students are tested to see how well they have mastered the strategy (Ellis et al., 1991). For example, in Ellis et al., the instructor watched as the student implemented the strategy in a natural classroom setting while completing an assignment and did not provide feedback during the assignment. For the last part of Step 7, the student and teacher celebrate successful mastery of the strategy and make a commitment to use the strategy in different situations. This step prepares the student for the next phase by brainstorming additional situations in which the strategy may be beneficial.

In Step 8, the generalization step, instructors provide many opportunities for the student to implement the strategy in many different activities (Ellis et al., 1991). It is important for a student to be able to independently identify activities in which the strategy can be implemented, because a strategy is less useful if it cannot be generalized

to new situations. Ellis and colleagues identified four specific phases in the generalization step: orientation, activation, adaptation, and maintenance. In the orientation phase, the teacher and student continue to discuss different contexts in which the strategy can be applied and how the strategy can be helpful in those situations. For example, in Ellis et al., the instructor and student discussed the different subjects for which the strategy could be used and the reason why. In the activation phase, students were prompted to practice the strategy in many different contexts and with different materials. For the adaptation phase, instructors suggested that the student think about how the strategy could be changed to work with different situations and activities. For example, in Ellis et al., the instructor and student made note cards containing the strategy in different textbooks to remind the student to use the strategy in each particular subject. The maintenance phase was used to monitor the use of the strategy over time.

Kent-Walsh and McNaughton (2005) suggested adapting the eight-step model developed by Ellis and colleagues (1991) to coach communication partners to become more supportive participants when interacting with children who use AAC. That is, instead of using the eight-step model to instruct students, Kent-Walsh and McNaughton proposed using the eight-step model to teach supportive communication skills to the communication partners of individuals who use AAC. In the adaptations suggested by Kent-Walsh and McNaughton, few modifications were required for steps one through four (i.e., pretest and make commitments describe the strategy, model the strategy, and verbal practice of the mnemonic). The major modification in these steps concerns the specific strategy that instructors would use to teach communication partners how to facilitate the communication skills of children who use AAC. For example, instead of

using the ASK IT! self-questioning strategy (Deschler & Schumaker, 2005), which has been used to teach students to read for details in complex reading materials, communication partners may be taught to use different strategies that address more AAC-specific issues (e.g., the need to ask non-yes/no questions, provide additional time for communication, etc.).

Kent-Walsh and McNaughton (2005) recommended more significant changes for Step 5 (controlled practice and feedback). In Ellis and colleagues (1991), the instructor provided feedback while the student practiced using the strategy in a controlled environment. Kent-Walsh and McNaughton suggested modifying this step by engaging in role-plays between the instructor and adult communication partner. The authors suggested this modification in order to provide the communication partners with "some initial practice sessions, during which only the instructor, the partner, and the individual who use AAC are present" (Kent-Walsh & McNaughton, 2005, p. 200). For this step, Kent-Walsh and McNaughton suggested that instructors provide feedback, which is faded as the communication partner demonstrates increased mastery.

For steps six (the advanced practice step) and seven (the posttest and make commitments step), both Ellis and colleagues (1991) and Kent-Walsh and McNaughton (2005) suggested the importance of the participants practicing and implementing the strategy within activities that more closely resembled real, daily life experiences. The authors suggested that Step 6 should include fading feedback while the student applies the strategy in more complex classroom activities (Ellis et al.) or the communication partner interacts with the student who used AAC in naturalistic situations (Kent-Walsh & McNaughton). Both sets of researchers suggested celebrating successful implementation

of the strategy, examining how the participants applied the strategy in natural contexts without feedback from the instructor, and securing commitment to long-term use of the strategy in different situations.

For generalization, the eighth step, Ellis and colleagues (1991) recommended that students continue to receive feedback from the instructor. Kent-Walsh and McNaughton (2005) modified this step by recommending that the communication partner implement the strategy with the child who uses AAC without any feedback from the instructor. These authors argued that it was important to see how well the communication partner had learned and implemented the strategy, and then provide additional support as needed. Both sets of authors recommended including a series of maintenance sessions in this step in order to determine the student's (Ellis et al, 1991) or communication partner's (Kent-Walsh & McNaughton, 2005) use of the strategy over time.

Kent-Walsh, Binger, and colleagues have conducted a series of studies in which communication partners, including educational assistants and parents, were taught using the eight-step instructional model, as originally developed by Ellis et al. (1991) with suggested modifications by Kent-Walsh and McNaughton (2005). In each of the following examples, the communication partners were taught to implement a form of the RAA! or RAAP! cueing hierarchy discussed above (i.e., Read, Ask, Answer, [Prompt]). In the first of these studies, Kent-Walsh (2003) studied the effects of an educational assistant instructional program on the communicative turns of students who use AAC during book reading activities. All six educational assistants learned to use the RAA! strategy accurately with their students who used AAC, and all six students increased their turn-taking skills. Using a very similar eight-step program, Binger and colleagues (2008)

taught Latino parents to support the multi-symbol messages of their children who used AAC. The authors included a focus group to ensure that the instruction model was culturally appropriate for use with Latino families. After receiving instruction via the eight-step program, all three parents consistently used a modified version of the RAA! strategy (i.e., modified to support multi-symbol message use, instead of turn-taking skills), and all children increased their use of multi-symbol messages after their parents began to use the cueing hierarchy. In another study, three educational assistants were taught to facilitate the multi-symbol message production of young students who required AAC (Binger et al., submitted). The researchers in this study used the RAAP! hierarchy, in which the last step of the hierarchy included a "prompt" step (i.e., a short verbal prompt such as "Your turn"). The three educational assistants in this study demonstrated use of the strategy with 90-100% accuracy in each of the post-instruction sessions. All three children also made dramatic improvements in their use of multi-symbol messages.

In each of these studies, the communication partners received instruction using the eight-step instructional model in a one-on-one setting; that is, the researchers provided individualized instruction with each educational assistant or parent until he or she achieved mastery of the RAA! or RAAP! cueing hierarchy. Since each student using AAC typically spends a significant amount of time interacting not only with the educational assistant and parents but also with classroom teachers, special education teachers, peers, and speech-language pathologists (SLP), it is important to teach facilitative communicative skills to all of these communication partners. The instructional time for each adult communication partner in prior studies lasted approximately 2 to 4 hours. Because the time involved with instructing all of the adults that students who use

AAC interact with may be prohibitive for some SLPs, group instruction would be more efficient.

Toward this goal, Kent-Walsh and Binger (2008) have completed an initial adaptation of this instructional program; that is, the program was modified for group instruction for parents of children who used AAC, with instruction being provided in an AAC camp setting. During this instructional program, researchers provided group instruction for ten caregivers of children who used AAC, following the eight steps described by Kent-Walsh and McNaughton (2005). Results from this investigation indicated that the parents learned new techniques to facilitate their children's communication, and the children demonstrated increases in the number of multi-syllable messages that they expressed. Children who use AAC interact with many adult communication partners in the school setting. It is important to teach all of these educators on the child's school-based AAC team to consistently support the communication skills of the child who uses AAC in a time efficient manner. For the current investigation, further adaptations were made to facilitate group instruction with a variety of adult communication partners centered on one child – that is, the child's school-based AAC team. Specifically, this study addressed the following research question: What was the impact of using an eight-step instructional model on the communication behaviors of one child's school-based AAC team, with instruction provided in a group setting?

Chapter 2

Methodology

Research Design

This study used a within-subjects group design to analyze the effects of the intervention. Measures were taken before the communication partner instruction (i.e., Step 1 of the program), during Step 7 of the program (see details in *Procedures* section), and during generalization (Step 8) to determine the extent to which the communication partners implemented the hierarchy (see Figure 1).

Participants

Adult communication partners who form the educational team for children using AAC were identified through the Assistive Technology Team at Albuquerque Public Schools (APS). A total of six adults participated in the study and included the following: two special education teachers, an educational assistant, an SLP, an occupational therapist, and a parent. Participant characteristics followed the recommendations of Kent-Walsh (2003) and Binger et al. (2008). The educators were employed by APS, were high school graduates (ranging from some college to graduate degrees), and had at least five years of classroom experience. All participants (including the parent) spoke English as a first language, had hearing and vision within functional limits (as determined by self-report), were able to fluently read the books that were used for the study, and regularly interacted with the student who uses AAC (Kent-Walsh, 2003). See Table 2 for further details.

Figure 1

Instructional strategy used by AAC team[1]

On each double-page spread in each book you read, you will RAAP! as follows:

Elicitation Component	Response Component
READ + MODEL provide 2-symbol aided AAC model **Pause** ASK + MODEL provide 2-symbol aided AAC model **Pause** ANSWER + MODEL provide 2-symbol AAC model **Pause** PROMPT "Show me 2" brief verbal prompt **Pause**	RESPOND to all two-symbol communicative turns taken by the child at any time by using a 2-symbol aided AAC model
RAAP, RAAP, RAAP!	

[1]From "Teaching Latino Parents to Support the Multi-Symbol Message Productions of their Children who Require AAC," by C. Binger, J. Kent-Walsh, J. Berens, S. Del Campo, and D. Rivera, *Augmentative and Alternative Communication, 24,* p. 323. Adapted with permission of the author.

The student, Stephen (pseudonym used), was a Latino child, aged 4;4, with Cornelia de Lange syndrome, a syndrome that is characterized by a small head, excessive body hair, developmental delay, and speech delay. Stephen was enrolled in a preschool classroom for students with special needs, required AAC to communicate, demonstrated limited use of two-symbol utterances during pre-instruction sessions, came from an English-speaking home, and had hearing and vision within functional limits (by parent

Table 2

Adult Participant Characteristics

Adult Participant	Occupation	Education Completed	Years of Classroom experience
Betty	Preschool special education classroom teacher	College graduate	5+
Claire	Occupational therapist	Graduate school	5+
Douglas	Father, waiter	Some post-high school education	N/A
Holly	Educational assistant	Some post-high school education	20+
Matt	Speech language pathologist	Graduate school	10+
Sandy	Preschool special education classroom teacher	College graduate	5+

Note: Pseudonyms were used.

report). Stephen previously had participated in storybook reading activities with each adult communication partners in the study. Informal observation of his speech sounds included neutral vowels and several stop and nasal consonant sounds (e.g., “mon” for “playing” and “ah ah ba-an” for “hot air balloon”); all speech productions had a nasal quality. Stephen had just received his speech-generating device (SGD), a Vantage™, at the onset of the investigation, and, although this was not the focus of the current study, the AAC team stated that they hoped that this study could help him learn how to use it. He primarily relied on gestures, facial expressions, and vocalizations to communicate. Stephen demonstrated eight out of nine skills required for pre-literacy on the Checklist of Emergent Literacy Skills & Sample Assessment Guide (Clay, 2001; Snow, Burns, & Griffin, 1998; see Appendix A). Stephen’s intelligibility was very poor with unfamiliar

partners, as indicated of the Index of Augmented Speech Comprehensibility in Children (Dowden, 1997). Stephen's performance on the Test of Auditory Comprehension of Language, 3rd edition (Carrow-Woolfolk, 1999) indicated that his receptive language skills were below the first percentile. Table 3 contains further demographic information for Stephen.

Table 3

Student Participant Characteristics

Student participant			I-ASCC		TACL-3 scores		
Name	Age sex	Disability	No context	Semantic context	Stand. score	%ile	Communication Modes
Stephen	4;4 M	Cornelia de Lange Syndrome	0%	10%	12	<1	Natural speech, gestures, Vantage™

Notes. I-ASCC = Index of Augmented Speech Comprehensibility in Children (Dowden, 1997). TACL-3 = Test of Auditory Comprehension of Language, 3rd ed. (Carrow-Woolfolk, 1999)

Procedures

Pre-instruction probes. Prior to implementing the strategy, each communication partner was videotaped while reading storybooks to the student in a one-on-one setting. Each session with each adult lasted 10 minutes. Partners were instructed to read to the child as they normally would. The adults were informed that they were participating in an AAC intervention study but were not given specific instructions about the strategy they would be using during the intervention phase. In all pre-instruction sessions, the child's AAC device was on the table with the communication "page" for the specific book available should either the adult or child wish to use it (see Figure 1 for an example).

Each communication partner used the same set of books during the pre-instructional probes that were used for the instructional context (i.e., *Little Critter* books).

Instructional program. The adult communication partners participated in an eight-step communication partner instruction program based on the original work of Ellis et al. (1991) and adapted by Kent-Walsh and colleagues (Kent-Walsh, 2003; Binger et al., 2008; Binger et al., submitted; Kent-Walsh & McNaughton, 2005). For the current study, two individuals served as instructors. The first instructor ("Instructor 1") was the thesis student (A. Thatcher) who had completed the training with the second instructor as part of a previous study and had achieved mastery in the strategy. The second instructor ("Instructor 2;" i.e., the thesis advisor) was a researcher (C. Binger) with 16 years experience as an SLP who had used the eight-step instructional model in multiple prior investigations

The eight-step instructional program adhered to the recommendations of Kent-Walsh and McNaughton (2005) and was modified for group instruction. Several major changes were made to the instructional program, compared with prior individualized instruction. First, instruction was provided in one full group session and several small group sessions, with data collection taking place within individual one-on-one sessions, as opposed to conducting all sessions within individualized settings. Second, in past studies, instruction was provided in an errorless learning environment, with instruction continuing until participants achieved mastery of the strategy. However, instruction for the current investigation was not always provided in an errorless learning environment; for example, during the large group instructional session, the instructors could not monitor all dyads simultaneously. Further, time constraints necessitated the study be

completed within 5 weeks (i.e., by the end of the school year), which prevented instruction from continuing until the participants achieved mastery. The specific steps of the instructional program, in addition to the setting in which each instructional session took place (full group, small group, or one-on-one), are listed below:

One-on-one with the child and full group

1. Instructor 1, under the supervision of Instructor 2, completed pre-testing and solicited each AAC team member's commitment to learning the targeted strategy (10 minutes for pre-testing; 5 minutes for commitment)
    a. Pretest: Individual 10-minute sessions (one session per participant, for a total of six sessions) – Adults read *Little Critter* books to the student and were instructed to, "Read as you normally would."
    b. AAC team members signed a contract indicating their commitment to learn and use the RAAP! strategy (see Appendix B)
2. Instructor 1 described the strategy to AAC team members (20 minutes)
    a. Instructors 1 and 2 and AAC team members watched five-minute pre- and post-instruction videos of an educational assistant reading stories to a child who needed AAC. In the pre-instruction video, the educational assistant did not use any particular strategies to elicit multi-symbol messages from the child, and the child produced no symbol combinations. In the post-instruction video, the educational assistant used the RAAP! strategy, and the child produced multiple symbol combinations on his AAC device.

i. Instructors and AAC team members discussed the differences in adult behaviors in the videos. Specifically, the following differences were noted in the post-instructional video: the educational assistant used aided AAC modeling, expectant delays, WH questions, and responses related to the child's utterances. Major differences with the child included increased turn taking, increased use of multi-symbol messages, and increased attention to the story.

b. Instructor 1 described the RAAP! cueing strategy to AAC team members (see Figure 1) while reading a Mercer Mayer *Little Critter* book (see Table 5 for an example).

i. Read a page and model at least two symbols on the AAC device, then provide an expectant delay

ii. Ask a WH question about the page read and model at least two symbols on the AAC device, then provide an expectant delay

iii. Answer the question asked in the prior step and model at least two symbols on the AAC device, then provide an expectant delay

iv. Prompt using a brief verbal phrase (e.g., "show me two")

v. Respond contingently to all of the child's multi-symbol messages by providing a multi-symbol aided AAC model

(e.g., expand the child's multi-symbol message verbally and with an aided AAC model)

3. Instructor 1 demonstrated use of the strategy to AAC team members (28 minutes)
    a. Instructor demonstrated use of the RAAP! strategy in a role-play activity
    b. Instructor used think-aloud statements (e.g., "I read a page and modeled two symbols on the device. Now I need to look at the student expectantly and pause for at least 5 seconds").
4. Instructors and AAC team members engaged in verbal practice of the strategy steps to help the AAC team members memorize the strategy using the RAAP RAAP RAAP! mnemonic (5 minutes)
    a. Instructor and adults rehearsed the steps of the RAAP! strategy, "Read, Ask, Answer, Prompt, and always respond with two symbols." The instructor and AAC team members said the steps together five times, then the team repeated the steps five times on their own, then the instructor said the steps five times, and finally, everyone said the step five more times as a group.

Full Group and Small Group

5. Instructors guided AAC team members to practice implementation of the strategy in controlled contexts (87 minutes total)
    a. Full group – Instructor demonstrated use of the RAAP! strategy in a storybook (*Little Critter* books) role-play activity with an AAC

team member who volunteered. The instructor played the AAC team member and the AAC team member played the child. Everyone discussed the RAAP! strategy, and the instructor answered questions (30 minutes)

b. Full group – AAC team members broke into groups of two and participated in storybook reading role-play activities (using *Little Critter* books) with the other AAC team members. Each team member took turns; that is, at times, a team member pretended to be him/herself reading to the child, and at other times, that same team member pretended to be the child. The instructors provided feedback as needed (32 minutes)

c. Small groups – AAC team members met separately in three groups of two and participated in role-play activities to practice the RAAP! strategy while the instructors provided feedback as needed (25 minutes each small group)

Small Group

6. Instructors guided AAC team members to practice implementing the RAAP! strategy in natural contexts (20 minutes per small group)
    a. Adults participated in storybook reading sessions (various *Little Critter* books) with the child for 10 minutes each while continuing to obtain feedback from the instructor.
    b. Each team member observed the other team member as they practiced

One-on-One with Child (20 minutes per AAC team member)

7. Instructor 1, under the supervision of Instructor 2, collected post-test measures: each AAC team member completed individual story reading sessions (from the *Little Critter* series) with the child without feedback from the instructor (10 minutes each).
8. Instructor 1, under the supervision of Instructor 2, collected generalization measures: each AAC team member demonstrated his or her ability to use the RAAP! strategy with the child, while reading storybooks from the *Dora the Explorer* series. (10 minutes per AAC team member).

Post-instruction probes. As indicated in Step 7 above, one post-instruction probe was taken for each communication partner following partner instruction. Each AAC team member read *Little Critter* books within a 10-minute session to determine each communication partners' use of the RAAP! strategy with familiar books.

Generalization probe. Immediately following the post-instruction probe (i.e., during the same session), a generalization probe (Step 8) was taken with each communication partner. In these sessions the communication partners used the strategy while reading *Dora the Explorer* books. One 10-minute book reading session was completed with each AAC team member to determine his/her use of the strategy with novel books. See Table 4 for additional timeline information.

Dependent Measures

The dependent measure included the accuracy of communication partners' implementation of the steps of the RAAP! strategy in obligatory contexts (i.e., at least once on each page in each book) during 10-minute reading sessions. The RAAP! strategy

Table 4

Timeline for Sessions

Participant	Date Consent Signed	Pre-Instruction	Large Group Instruction	Small Group Instruction	Post Instruction & Generalization
Communication partner	Day 1 – 3	Day 9 – 15	Day 17	Day 19 – 25	Day 29 – 43

contained five steps. As the steps are a part of a least-to-most cueing hierarchy, each successive step was only provided until the child produced a two-symbol message. Data were collected on the AAC team members' implementation of these steps. See Table 5 for an example of the adult implementing the strategy steps.

In the example in Table 5, the adult performed Steps 1, 2, 3, and 4 correctly, in addition to pausing between steps and responding contingently. Therefore, the data would indicate the adult successfully implemented eight out of eight, or 100%, of the instructional steps accurately for this interaction (See Appendix C). Although this was the only dependent measure, the communication partners' actions were dependent on the student's responses or lack of responses. Data on the child's turns were therefore collected (although not reported here, as child data are not the focus of this manuscript), including the frequency of turns, type of turns (e.g., points to picture in story; makes AAC device selection), and expression of multi-symbol utterances, so that an appropriate determination of the adult partners' behaviors could be recorded accurately.

At the end of the generalization session, informal feedback was collected from the adult participants to determine their opinions of the specific impact the study had on his or her skills as a communication partner. The instructor asked each AAC team member

Table 5

Example Script of Communication Interaction using RAAP! Strategy

Speaker	Communicative turn	Corresponding Step
Communication partner	*Little Critter took a bath! LITTLE CRITTER BATH* [pauses]	Step 1: Read + aided AAC model, + expectant delay
Child	[does nothing]	
Communication partner	*What is Little Critter doing? WHAT LITTLE CRITTER* [pauses]	Step 2: Ask + aided AAC model, + expectant delay
Child	*LITTLE CRITTER*	
Communication partner	*Little Critter is taking a bath. LITTLE CRITTER BATH* [pauses]	Step 3: Answer + aided AAC model, + expectant delay
Child	*BATH*	
Communication partner	*Show me two.*	Step 4: Prompt using a short direct phrase
Child	*LITTLE CRITTER BATH*	
Communication partner	*That's right! Little Critter is taking a bath. LITTLE CRITTER BATH*	Contingent Response: Respond to each multi-symbol message taken by child at any time using an aided AAC model)

Note: Taken from Mercer Mayer's *Just Me in the Tub*

open-ended questions, including, "What did you think about your experience?" and each team member's responses were videotaped. They were asked to share comments about his or her experiences and discuss the educational impacts they thought the program would have on the student. They were also asked to share how their interactions with the student had changed after learning the strategy.

Materials and Instrumentation

Storybooks were used as a context for instruction, as books promote literacy skills and also provide a common context for communication. The guidelines used by Binger

and colleagues (2008) were used to select the two sets of books for the instruction. The books selected (a) had illustrations; (b) were age appropriate; (c) were culturally appropriate; (d) were appropriate for the receptive language level of the child (as determined by the *Test of Auditory Comprehension of Language, 3rd edition*); (e) were motivating to the child; (f) were a series of books, and (g) included at least six double-page spreads (i.e., 12 pages). As student motivation largely determined the sets of books that were used, the amount of text on each page was not controlled. However, an attempt was made to ensure that the amount of text is roughly equal for both sets of books (*Little Critter* and *Dora the Explorer)*. Different books in the series of 11 books were randomly selected across partners. Communication "pages" designed for each individual book were developed for the specific AAC device that the child was currently using. These pages were organized using Fitzgerald keys (McDonald & Schultz, 1973); that is, symbols were organized from left to right, following typical word order patterns (agents, actions, descriptors, objects, etc.). See Appendix D for an example.

Procedural Integrity

A procedural standard developed by Kent-Walsh (2003) and revised by Binger and colleagues (2008) was used for this investigation. Sessions were videotaped, viewed, and evaluated by a trained Speech and Hearing Sciences (SHS) student. The student used a procedural checklist, based on the procedural integrity standard (See Appendix E), to determine the reliability of the communication partner sessions. Procedural integrity was evaluated for 100% of both the large group and small group sessions in which the communication partners received instruction from the thesis student and thesis advisor to ensure that the instructors adhered to the procedural standard. Procedural integrity was

calculated as follows: the number of procedural steps correctly implemented divided by the sum of the number of steps correctly implemented, incorrectly implemented (e.g., skipped a step), and omitted (in obligatory contexts). These measures were taken after each instructional session. Procedural integrity for the large group session was 100%. Procedural integrity for the small group sessions averaged 94% (range = 83% – 100%), indicating that the instructional protocol was followed adequately across all sessions.

Coding and Reliability

Coding. Each session for which dependent measures were taken (i.e., pre-instruction, post-instruction, and generalization probes) was digitally videotaped and transcribed by the thesis student, with additional assistance from two trained SHS students. Detailed information was transcribed, including adult behaviors (all spoken words including reading text and other speech, and actions that help to describe events such as page turning and pointing to pictures in the story) and child behaviors (all communication modes including: use of aided AAC, symbolic gestures, vocal approximations, intelligible words, and gestures). Once each transcript was complete, the thesis student calculated the dependent variable; specifically, the thesis student indicated if the adult communication partner correctly performed each obligatory step in the hierarchy and computed a percent accuracy by dividing the number of steps correctly implemented in each session by the total number of steps prior to the student's response (i.e., implemented correctly, implemented incorrectly, or missing within each session).

Transcript and data reliability. Reliability was calculated separately for the transcripts and for the data. For transcription reliability, 36% of the sessions for each adult-child measure were re-transcribed by two other transcribers (i.e., trained SHS

students). Reliability measures were taken on all of the communication partners' spoken and AAC messages for these transcripts. Differences in transcripts were discussed between the thesis student and the other transcribers until an agreement was made (Fey, Cleave, Long, & Hughes, 1993). The overall mean transcript reliability was 95% for adult behaviors (91% – 98% per session) and 96% for child behaviors (90% – 100% per session), indicating the transcripts were reliable.

To obtain data reliability, one SHS student independently reviewed the videotapes and transcripts and coded the dependent measure in the same manner as the thesis student. Cohen's kappa (Shrout, Spitzer, & Fleiss, 1987) was used to calculate inter-rater reliability for data collection on the adult dependent measures. Kappa for the adult measures was 0.86, indicating that the coders reliably recorded the adults' implementation of the instructional steps.

Data Analysis

To determine the effectiveness of instruction, measures from pre-instruction probes were compared with the post-instruction probes (Step 7), with the hypothesis being that there would be significant differences in the communication partners' behaviors. To determine the communication partners' ability to generalize use of the instruction to novel stories (Step 8), post-instruction data were compared with generalization data, with the hypotheses that there would be no significant differences between either set of data; that is, it was anticipated that the adults would generalize use of the strategy to a novel set of storybooks. As the number of participants was small (i.e., six adults), non-parametric statistics (i.e., Wilcoxon signed-rank test) were used to analyze the differences in the participants' performance pre- and post-instruction, as well

as to compare post-instruction and generalization measures (Schiavetti & Metz, 2006). In addition, the percent accuracy for RAAP! strategy use for each adult participant was reported.

Chapter 3

Results

Intervention

None of the six AAC team members demonstrated use of the RAAP! strategy prior to the instructional phase (i.e., 0% during each pre-instruction probe). Following a 2-hour group instruction and a 45-minute small group instruction, the group implemented the strategy with an average of 75% accuracy. There was a statistically significant difference between pre-instruction and post-instruction probes for the group data, indicating the instruction was effective ($p = 0.04$; $W = 21.0$). Five of the adult participants used the strategy with at least 79% accuracy during the post-instruction probes; Douglas, Stephen's father, used the strategy with 44% accuracy during this probe. The highest increase in accuracy of the strategy from pre-instruction measures was Sandy, at 85% (see Table 5).

Generalization

All of the AAC team members used the RAAP! strategy with at least 59% accuracy during the generalization sessions. The mean for the group was 74% accuracy across all generalization probes. There were no significant statistical differences between post-instruction versus generalization sessions ($p = 0.53$; $W = 7.0$), indicating that the adult participants effectively generalized the strategy to novel storybooks. Sandy used the strategy with the highest accuracy, at 92% (see Table 6).

TABLE 6

Results for Individual AAC Team Members

Participant	Pre-Instruction	Post-Instruction	Generalization
Betty	0%	84%	71%
Claire	0%	83%	63%
Douglas	0%	44%	80%
Holly	0%	74%	59%
Matt	0%	83%	80%
Sandy	0%	85%	92%
M	0	75.5	74.17
SD	0	15.93	12.25

Notes: Non-parametric statistics for pre-instruction vs. post-instruction indicated a statistical difference with $p = 0.04$; $W = 21.0$. Non-parametric statistics for post-instruction vs. generalization indicated no statistical difference with $p = 0.53$; $W = 7.0$.

Feedback

Following the generalization sessions, each AAC team member was given the opportunity to provide informal feedback about the study. Most of the comments were positive and included statements such as: “Before, this [AAC device] was like a foreign language to me, this helped me negotiate more. I want to learn how to program it for what I want him to learn”; “The pages were set up well, I didn’t have to move around on [the AAC device]”; “I saw that he was [talking about what was on the page] especially in the second book (*Dora the Explorer*)”; and “There are so many things he could tell us expressively that we couldn’t understand [before]”. Stephen’s father said, “We’re glad that we are able to know how to help him at home the same way the teachers help him at school.” Team members also expressed the following frustrations: “In my mind, I wanted

to follow him and not go back to [the RAAP! strategy]…it's just not natural feeling yet"; "I feel all right about [the RAAP! strategy], but personally, I'd want to have more flexibility in responding to him"; and "I get a little frustrated when he keeps pushing the same button over and over, but that's just him." The adult participants indicated that they were anxious to apply the RAAP! strategy in other areas of Stephen's school and home life.

Chapter 4

Discussion

Group Outcomes

The results of this study indicated that use of the eight-step instructional program within a group instructional format was an effective way to implement the RAAP! strategy; as a whole, the group made substantial progress. There was a significant increase in the adult participants' use of the strategy from pre-instruction to post-instruction measures. In addition, the AAC team members were able to generalize use of the strategy to a novel set of storybooks; results indicated no significant differences in the communication partners' use of the strategy from the post-instruction probes to the generalization probes.

Time spent in Instruction

A major focus of the current study was to determine if a group instructional format was a viable way to implement an eight-step instructional approach for instructing school-based AAC teams. In prior published studies, Kent-Walsh and colleagues (e.g., Kent-Walsh, 2003; Binger et al., 2008) provided one-on-one instruction for communication partners, with each instructional period lasting approximately 2 to 4 hours per adult participant. A major benefit of the format used for the current investigation was that this approach was more efficient for the instructor. That is, the instructor spent less time providing instruction for the AAC team members than she would have if each team member had received individualized instruction. In the current study, a total of one 2-hour large group session and three 45-minute small group sessions (2 AAC team members per small group) were conducted. Thus, the total amount of time

that each communication partner spent in instruction in the current study was comparable to that spent in other published studies (i.e., 2.75 hours in the current study, versus 2.4 – 2.7 hours in Binger et al., 2008). However, the amount of time required from the investigator decreased significantly. For the current study, the investigator spent a total of 4.25 hours providing instruction for the six AAC team members. If these had been individualized sessions, the instructor would have spent approximately 15 hours in instruction (i.e., ~2.5 h x 6 communication partners). Therefore, the group instructional approach saved the instructor a significant amount of time. This program would typically be implemented with a student's educational team by an SLP. Due to fiscal constraints and lack of SLPs, school-based professionals tend to have large caseloads and little time for additional duties (Edgar & Rosa-Lugo, 2007; Fimian et al., 1991), so efficient use of time is critical. If an SLP could teach other members of the student's educational team to provide a consistent way to support the student's communication skills in a relatively short time period, the student, SLP, and educational team would all benefit.

Group Dynamic and Team Building

Changing the format of instruction from individual to group sessions resulted in changes to more than just the amount of time the instructor spent with the AAC team; providing instruction within group settings also may have changed the dynamic of the interaction between participants and instructors during the instructional sessions. In the two-hour large group session, participants asked many questions, to both the instructors and their fellow participants. They asked specific questions such as, "Can we go over the individual pictures with him before we start?" and raised meaningful issues, including discussing specific actions they thought Stephen would take and how to handle them.

Although such discussions were beneficial, the tradeoff was that the adult participants had less time to practice using the strategy than communication partners in previous studies, and unfortunately, sessions could not be extended due to time constraints. Therefore, the adult participants spent less time practicing use of the RAAP! strategy both within role plays (Step 5) and with the child (Step 6) before needing to move on to post-instruction measures (Step 7).

This tradeoff, however, had its benefits, including helping to build a team spirit for the child's AAC team. For example, the classroom teachers recognized the benefit of including the occupational therapist (OT) in the study and suggested that she be invited to join the group. The camaraderie throughout the study was perceived to have reinforced the team focus. All members on the child's educational team received instruction together, were able to learn as a team, and gain insight from other's questions, comments, and practice. The AAC team members seemed to be motivated by the provision of instruction within a group setting, and recognized the benefit of using a consistent approach to support the student in his communication skills. For example, the OT stated, "I think, as a team, we need to be consistent about using [the AAC device]" for activities other than just storybook reading.

Feedback

The feedback from the adult participants was largely positive and indicated that they thought the student had become a more active participant in the structured storybook activities. The participants also indicated that the instruction and the experience as a whole made them more comfortable with the AAC technology. As a team, they thought it was important to use the strategy consistently in all individual sessions to help Stephen

communicate effectively in all areas of school and home. Several team members did mention potential drawbacks, including concern for how the strategy impacted the naturalness of their individual storybook reading techniques. However, they recognized that additional practice time would have made sessions flow more effortlessly, and they expressed interest in learning to modify the strategy to make it work for individual reading styles.

Results Compared with Prior Studies

Results from the current study indicated that the AAC team members made marked improvements in their use of the RAAP! strategy. However, many of the communication partners in prior studies demonstrated higher accuracy levels; that is, all of the adult participants implemented the strategy with at least 80% accuracy in post-instruction measures in prior published studies (Binger et al., 2008; Kent-Walsh, 2003), compared with strategy implementation that was as low as 44% in the current investigation. To look at the data another way, the AAC team members in the current study used the RAAP! strategy with greater than 90% accuracy in only 1 out of 12 post-instructional sessions. However, in prior studies, adult communication partners achieved this level of accuracy in the majority of their post-instructional sessions. The communication partners in both prior studies and the current study had similarly low levels of experience with AAC. Difference in characteristics of adult participants does not appear to be a cause of differing results.

Several other variables may have contributed to these differences. First, although the actual time spent on instruction was roughly equivalent for the current study compared with prior studies, the adult participants in prior studies spent more time

engaged in role-plays, as opposed to spending time engaged in group discussions. This may have impacted the communication partners' accuracy of implementing the strategy in the current investigation.

In addition to time spent in role plays, another issue relating to role plays may have impacted the results. Role-plays in prior studies were completed within individualized sessions with the instructor, and these communication partners therefore had the advantage of practicing with the undivided attention of this expert. In contrast, the role plays in the current study were completed with other adult participants who were learning the RAAP! strategy at the same time, while the two instructors observed and provided feedback for each dyad. It is possible that providing group instruction in this manner allowed the adult participants to make mistakes during role-play activities. During the large group instructional session, 3 small groups (containing 2 adult participants each) practiced using the RAAP! strategy within role plays, and it is possible that the two instructors were not able to immediately correct every mistake that occurred. Thus, the instruction was not implemented in a completely errorless learning environment, which may have contributed to the fact that post-instruction measures for the current investigation were lower than those reported in prior studies.

Another variable that differed between prior studies and the current investigation was teaching the strategy to mastery versus teaching the strategy within a time constraint. The fast pace of the current study, with strict constraints placed on the time spent in instruction, did not allow the adult participants to practice the strategy until they reached mastery, as was the case in prior investigations. The communication partners in prior studies also were able to practice reading a minimum of 20 pages, using the RAAP!

strategy with the child before post-instruction measures were taken. No AAC team member in the current study practiced for 20 pages with or without the child prior to taking post-instruction measures.

On a related note, the time constraints of the current study (as opposed to teaching to mastery) may have increased the frustration level of some of the adult participants. For example, during the post-instruction sessions, Betty stated that she did not remember where she was in the strategy and threw her hands up several times. She also stated that she needed to practice more to be able to implement the strategy while continuing to incorporate her personal style into the storybook reading sessions. In the current study, the adult participants were taught the strategy, practiced one time with the child during the small group sessions, and then participated in a total of two post-instruction probes each. In prior studies, the adult communication partners had time to practice the strategy with the child during a minimum of five post-instructional sessions, allowing more time for each adult to increase his or her comfort level with using the RAAP! strategy.

Finally, the child's fatigue may have played a role in decreasing the AAC team members' accuracy with implementing the RAAP! strategy. In order to complete the investigation before the end of the school year, Stephen needed to complete two 10-minute storybook reading sessions each day, which was more time than he typically spent reading stories at one time. At times, the student disengaged by looking away, closing his eyes, pushing the book or AAC device away, or walking away from the AAC team member. When Stephen showed signs of extreme fatigue, the sessions were discontinued if the adult participants could not redirect his attention to the story. In 5 out of 18 sessions, full 10-minute sessions could not be completed due to the student's behaviors.

At times, the adult participants were able to redirect Stephen's attention to the stories; however, their focus on trying to maintain his attention sometimes may have resulted in their need to abandon use of the RAAP! strategy momentarily, thereby decreasing their performance on the dependent measure.

Future Research

In the current study, only one AAC team was included. As all children are different, and different groups may be expected to interact differently, the results must be replicated with additional school-based AAC teams. Future studies in which multiple AAC teams receive instruction would provide additional information about group dynamics and how to break the larger group into small groups as effectively as possible. On a related note, future studies that examine the effectiveness of instructional programs should include both control and treatment groups to strengthen the experimental design.

Teaching to mastery versus teaching to a time constraint also warrants further investigation. When working with school-based AAC teams, time constraints – for both the SLP who is serving as the instructor and for the remaining members of the AAC team – will surely be a reality for many teams. Further research is needed to ensure that instructional programs do not require unreasonable time commitments while still providing enough instruction to result in significant change for team members and for students who use AAC.

Of course, the ultimate question is, "How will group instruction of an AAC team impact the performance of the student?" In the current study, only the behaviors of the AAC team members were evaluated, not the outcomes for the child who used AAC.

Therefore, future studies are required to examine the impact of using group instruction on the communicative outcomes of children who use AAC.

APPENDICES

Appendix A

Checklist of Emergent Literacy Skills & Sample Assessment Guide
Based on the work of Clay (2001) and Snow, Burns, and Griffin (1998)

_____ recognizes specific books by cover.
- *If comments demonstrating this skill are not spontaneously elicited, present several familiar and unfamiliar storybooks to child and ask "What books did you read before?"*

_____ knows the end at which a book starts.
- *Start opening a book to be read at the back cover and say "Let's start reading this one."*

_____ pretends to read books.
- *While holding a book with the child, say "Now you read the next page to me."*

_____ understands that books are handled in particular ways
(e.g., books are held right-side-up, pages are turned individually).
- *Hold book upside down and say "Let's start reading."*

_____ labels, comments on, or points to objects or characters in a book
- *If child does not spontaneously do this, ask "Where is the mouse in the picture?"*

.

_____ recognizes pictures as symbols for real objects.
- *Aided AAC system use considered to be evidence of this skill.*

_____ * listens to stories.
- *Monitor child's attention and behavior as stories are read across a 12 minute time period for evidence of this skill.*

_____ requests/commands adult to read or write.
- *If child does not do this spontaneously, stop reading in the middle of a page.*

_____ * answers simple questions based on story.
- *Who, Where, What, Why, How, and When Questions related to text and illustrations in book. [students required to respond to at least two types of WH--ended questions with at least 80% accuracy (e.g., 4/5 accurate responses to "who" questions)].*

Summary: Number of skills evidenced: ___ / 9

* required skills

Appendix B

Instructional Program Contract

PARTICIPATING PARENT/INSTRUCTOR

I, _____, understand that the goal of the instructional program in which I will participate is to increase the expressive language skills of the child during book reading activities. I understand that I will learn to use a specific strategy to facilitate the communication of the child (_____).

I am committed to learning to implement the strategy and to fully participating in the following instructional activities:

- In today's session, I will learn about the strategy that we will be using throughout the instructional program, and I will have an opportunity to practice using this strategy during role-plays with other parents and the instructors.
- Then I will have the opportunity to practice using the strategy during role plays and during book reading activities with the child.
- In another instructional session, I will review my progress and commit to a long-term plan for continuing to use the strategy.
- I will participate in any additional instructional sessions required to facilitate my learning.

I understand that these instructional sessions will involve approximately five hours of my time.

PARENT/INSTRUCTOR

I, _____, agree to conduct the above-listed instructional sessions with _____, in order to assist him/her in learning to implement the strategy.

_____ _____

Participating Adult Date

_____ _____

Instructor Date

Appendix C

Sample Adult Data Sheet

ADULT DATA

Dyad ID code: _____ Session: _____
Tape Marker: [Start _____; End _____]

Legend:
1 = Read Text + 2 Sym Model; 2 = Expectant Delay (ED);
3 = Ask WH Question + 2-Sym Model; 4 = ED; 5 = Answer + 2-Sym Model; 6 = ED; 7 = Prompt; 8 = Approp. Resp.

Session Phase: Baseline Instruction Maintenance/Generalization

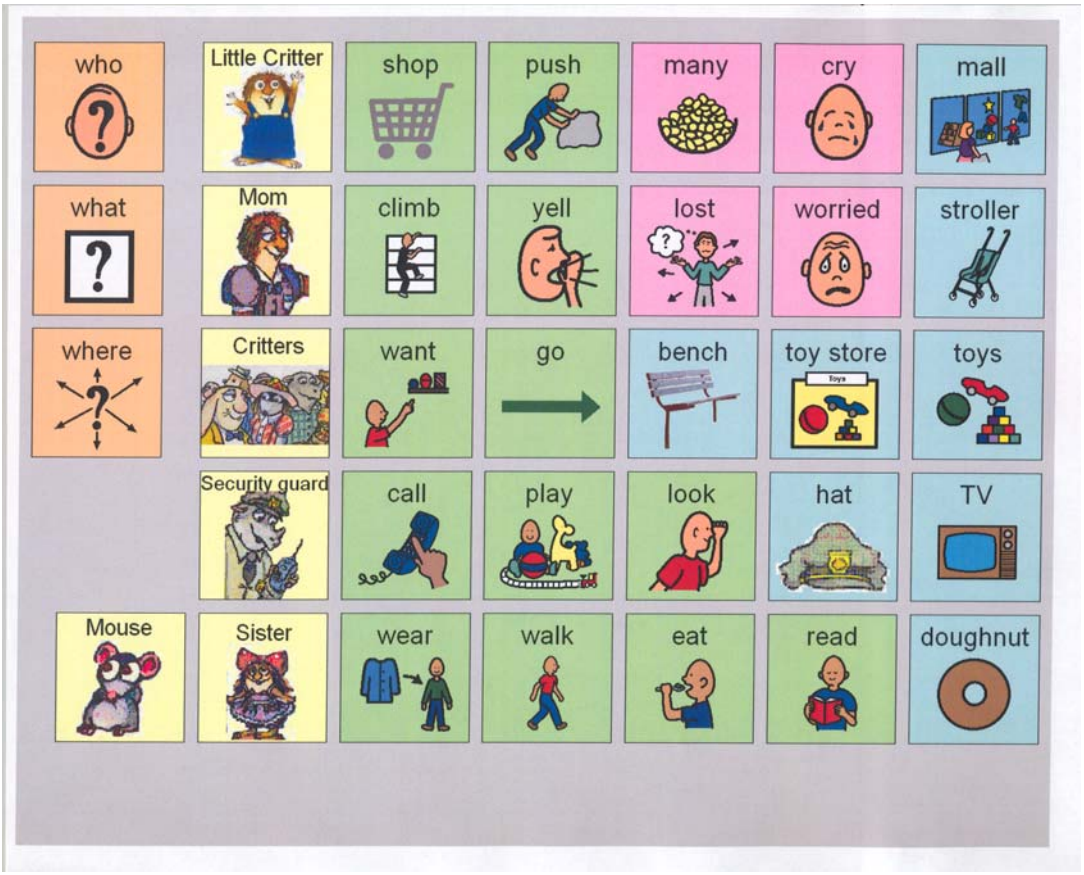
Book	Double Page Spread Count	Double Page Spread #	Strategy NOT Imple-mented	Implementation of Communicative RAAP! Strategy			
				Tape Marker	Correct Implem. Steps	Incorrect Implem. Step(s)	Notes
	(1)						
	(2)						
	(3)						
	(4)						
	(5)						
	(6)						
	(7)						
	(8)						
	(9)						
	(10)						
	(11)						
	(12)						
	(13)						
	(14)						
	(15)						
	(16)						
	(17)						
	(18)						
Total							

Calculations
Total # Correctly Implemented / Total # of Opportunities (Double Page Spreads)

_____ / _____ = _____

Appendix D

Sample AAC Device "Page" Organized using a Fitzgerald Key



Appendix E

Procedural Standard Checklist

INTRODUCTORY SESSION

Large Group Instruction

Child Code #: _____

Instructional Step	Instructional Components	Implementation of Step	
		Correct	Incorrect
Describe & Make Commitments	view 2 videotapes		
	discuss differences in tapes		
	explain goal of instructional program		
	discuss advantages of using RAAP! strategy		
	review, complete, and sign contract		
Model	role play – researcher plays role of adult & adult plays role of student using AAC device		
	researcher talks aloud during role play		
Verbal Practice	researcher & EA complete verbal practice of "RAAP-RAAP-RAAP!" (i.e., "read, ask, answer, prompt").		
Controlled Practice & Feedback	role play – adults pairing up and taking turns playing role of child & self		
	researcher provides prompts and/or feedback		
	researcher encourages adults to think-aloud statements or using them ourselves to supplement		
	practice RAAP! strategy as a whole - go through all the steps ('child' does not do 2 symbols)		
	practice RAAP! strategy as a whole - practice what to do when child DOES use at least 2 symbols		
TOTAL			

Calculations

Total # of Correctly Implemented Components / Total # of Correctly Implemented Components + Total # of Incorrectly Implemented Components

_____ / 13 = _____

Appendix E (con't)

Procedural Standard Checklist

PRACTICE SESSIONS

Small Group Sessions

Child Code #: _____ Training Session #: _____

Instructional Step	Instructional Components	Implementation of Step	
		Correct	Incorrect
Controlled Practice & Feedback	role-play – adults take turns playing 'child' and self		
	researcher provides prompts and/or feedback		
	researcher encourages adult to think-aloud (or uses think-aloud statements herself)		
	practice RAAP! strategy as a whole - go through all the steps ('child' does not do 2 symbols)		
	practice RAAP! strategy as a whole - practice what to do when child DOES use at least 2 symbols		
	Guided practice: real child interacts with each adult		
TOTAL			

Calculations

Total # of Correctly Implemented Components / Total # of Correctly Implemented Components + Total # of Incorrectly Implemented Components

_____ / 6 = _____

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