Teaching Paraeducators to Support the Communication of Individuals Who Use Augmentative and Alternative Communication: A Literature Review

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Individuals with complex communication needs (CCN) who rely on augmentative and alternative communication (AAC) to communicate in school and community activities often have paraeducators[1] as communication partners. For individuals who use AAC, successful communication often depends upon their personal skills as well as the skills of their communication partners. Because the skills of communication partners are critical, and can be taught, a review was conducted to identify the effect of teaching paraeducators to provide appropriate communication supports for individuals using AAC using studies that included data for both paraeducators and individuals with CCN. Studies were analyzed using the recommendations from the Communication Partner Instruction Model (Kent-Walsh & McNaughton, 2005). Findings from seven studies suggest that communication partner training to paraeducators can have positive outcomes for the communication behaviors of both paraeducators and individuals using AAC. Implications for practice and future research directions are addressed.

Keywords: augmentative and alternative communication, training, paraeducator, communication partner, communication

Effective communication is essential to inclusion in society and quality of life for individuals with disabilities (Downing, 2005; Sack & McLean, 1997). However, many individuals with disabilities, especially those with complex communication needs (CCN) including individuals with cerebral palsy, autism, and intellectual disabilities, find communication challenging (Beukelman & Mirenda, 2006). These individuals often experience difficulty understanding and producing speech (Reichle, 1997). As a result, individuals with CCN may be excluded from many communication opportunities (Sack & McLean, 1997).

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[1]For the purpose of this article the term paraeducator refers to personnel who support individuals with disabilities in educational, vocational, and human service organizations. Paraeducators carry out plans designed by teachers or human service professionals. In the literature paraeducators are also referred to as paraprofessionals, educational assistants, instructional assistants or aides, program staff, carers, etc.

Augmentative and Alternative Communication

In order to assist communication interactions, many individuals with CCN are provided with augmentative and alternative communication (AAC) including the use of gestures, signs, speech generating devices (SGD), or communication boards (Beukelman & Mirenda, 2006). However, the provision of an alternative means of communication does not guarantee a successful interaction (Calculator & Luchko, 1983; Schepis & Reid, 2003). Communication involves two or more persons (Reichle, 1997) and both the individual using AAC, as well as the communication partner, need to adapt to the skills and needs of each other for the interaction to be successful (Mirenda, Iacono, & Williams, 1990; Schepis & Reid, 2003).

Paraeducators

To support inclusion in general education, as well as societal participation for individuals with disabilities, paraeducators often are hired as support personnel in the United States (Downing, 2005; Reid, 2004). Human service organizations rely on paraeducators to assist individuals with disabilities in self-care, adaptive living, leisure skills, and communication (Wood, Luiselli, & Harchik, 2007). Similarly, educational organizations rely on paraeducators, who work under the supervision of teachers and other professionals (i.e. physical therapists, speech language pathologists), to implement instruction and assess the progress of the individuals they support (Pickett, 1999). Employment of paraeducators in educational settings has increased dramatically over the past 50 years (French & Pickett, 1997). According to the National Center for Education Statistics (2006), from 1995 to 2005, the number of paraeducators employed in the United States increased by 41%; during the same time period, the number of teachers employed in the United States increased by 21%.

The roles of paraeducators in the United States have evolved over time as inclusive practices have expanded (French, 1996). Traditionally paraeducators engaged in non-instructional roles (e.g., clerical, custodial tasks). However, today many paraeducators engage in delivering instruction (French & Pickett, 1997; Giangreco, Edelman, Broer, & Doyle, 2001). These increased duties have resulted in paraeducators becoming frequent communication partners for individuals with CCN (Beukelman & Mirenda, 2006).

Communication Partner Strategies

When communication partners make use of appropriate interaction strategies (e.g., providing opportunities for communication), they increase the likelihood of a successful interaction and support development of new skills by the individual with CCN (Blackstone, 1986; Sack & McLean, 1997). Unfortunately, past research provides evidence that communication partners of individuals with CCN find it difficult to support communication and often engage in

behaviors that reduce the likelihood of a successful interaction and limit development of new skills (Mirenda et al., 1990; Purcell, McConkey, & Morris, 2000). For example, communication partners may anticipate the needs of individuals with CCN, limit communication opportunities, and fail to recognize communication attempts (Mirenda et al., 1990; Sigafoos, 1999). In addition, communication partners may ask primarily closed questions such as "yes/no" questions (Purcell et al., 2000) and may dominate communication interactions (Light, Collier, & Parnes, 1985; Kent-Walsh, Binger, & Hasham, 2010). Teaching communication partners (e.g., paraeducators) to utilize more appropriate interaction strategies can help individuals with CCN experience communication success in both current and future interactions (Blackstone, 1986; Kent-Walsh & McNaughton, 2005).

Strategy instruction is a set of instructional procedures used to assist learners as they acquire academic and social skills (Ellis, Deshler, Lenz, Schumaker, & Clark, 1991). Research has demonstrated the effectiveness of strategy instruction to help learners develop and generalize complex cognitive skills (Ellis et al., 1991). For example, strategy instruction has been shown to be beneficial in assisting students as they acquire comprehension skills (Gersten, Fuchs, Williams, & Baker, 2001), writing skills (Graham & Perin, 2007), and language skills (Chamot, 2005). Strategy instruction has also been shown to be beneficial for adult learners (Harrison, 2003).

Based on the strategy instruction model of Ellis et al. (1991), which was built off of the strategy instruction research of Deshler et al. (1981), a Communication Partner Instruction model was suggested by Kent-Walsh and McNaughton (2005) to provide instructional guidelines to aid learners acquire, generalize, and maintain targeted strategies for supporting communication. The Communication Partner Instruction model (Kent-Walsh & McNaughton, 2005) includes eight stages. The first stage of the model is a *pretest* and *commitment to instructional program*. This includes a measure of current communication for the individual with CCN, current communication techniques used by partners, and an analysis of how communication could be improved. The partner then commits to participate in the program and learn strategies to improve communication in targeted areas. In the second stage, instructors *describe the communication strategy* that will be used. This includes a method to help remember the steps involved in the strategy and a discussion about the impact strategy use can have for the partners, individuals with CCN, and their families. The third stage is a *demonstration of the strategy* with an explanation of each step.

After pretest, strategy description, and strategy demonstration, participants begin to practice and implement the strategy. In the fourth stage, participants

engage in *verbal practice of strategy steps*. The fifth stage involves *controlled practice and feedback* of the strategy by the instructors with gradual fading of prompts. Then in the sixth stage *advanced practice and feedback* are provided by the instructors. The seventh stage involves a *post test* measure to ensure mastery of the target strategies, and comparison with baseline measures of communicative participation of individuals with CCN and the communication interactions of the communication partner. In this stage, a *long-term commitment* is made to ensure continued strategy use. The eighth and final stage consists of *strategy generalization* to a variety of settings.

Communication Partner Research Reviews

Past literature reviews in communication partner training have investigated communication partner training to human service staff (Smidt, Balandin, Sigafoos, & Reed, 2009) and to communication partners working with individuals with cerebral palsy (Pennington, Goldbart, & Marshall, 2004). Smidt et al. (2009) reviewed six studies where training was provided to staff working with individuals with intellectual disabilities. Results of the review indicated that in five of the studies behavior changes were noted for staff. However, most studies did not measure communication outcomes for individuals with disabilities as part of the study. The review conducted by Pennington et al. (2004) included four studies where communication partner training was provided to parents, teachers, and/or teaching assistants working with individuals with cerebral palsy. Results of this review indicated behavior changes by communication partners in three studies, and no changes in the behavior of communication partners in one study. In addition, three studies provided measures of child changes in communication behaviors, while one provided no data related to the communication of children in the studies.

The reviews by Pennington et al. (2004) and Smidt et al. (2009) help provide an initial understanding of how communication partner training might be conducted, and the importance of measuring outcomes for both individuals with disabilities as well as their communication partners. However, to date a review has not been conducted of studies where communication partner training was provided to paraeducators (including support staff) and outcomes for individuals using AAC were also measured. Given the use of paraeducators in many educational and human service settings (Pickett, 1999; Wood et al., 2007) and the call for adequate training of paraeducators (French & Pickett, 1997), a review in this area is needed. In addition, communication is a complex, but necessary skill for individuals with CCN and may require strategic instruction for communication partners to ensure success (Kent-Walsh & McNaughton, 2005). Therefore, given the research basis of the Communication Partner Instruction model (Kent-Walsh &

McNaughton, 2005) in strategy instruction, the model may be helpful as a standard by which the instructional components of studies might be compared.

Research Questions

A review of existing literature was conducted to look at training for paraeducators supporting individuals with CCN. The following five questions were addressed in the review: (a) What are the characteristics (e.g., demographics for paraeducators and individuals using AAC, setting, study design) of studies where communication partner training is provided to paraeducators?; (b) What is the paraeducator communication training content and format?; (c) What instructional procedures typically are included in paraeducator training?; (d) What is the effect of communication training on paraeducator behavior (e.g., responding to communicative attempts)?; and (e) What is the effect of paraeducator communication training on the communication performance of individuals with CCN?

Method

To answer the stated research questions, a search was conducted to identify studies in which paraeducators were trained to support the communication of individuals with CCN. Inclusion criteria limited the review to studies that met the following five criteria: (a) printed in English; (b) described experimental research; (c) published in a peer reviewed journal; (d) targeted paraeducators or program staff supporting individuals using AAC as participants for training; and (e) provided information about the AAC system used by the individuals with CCN and data about communication of the individuals using AAC. An electronic search of PsycINFO, Web of Science, and JSTOR databases was conducted using the following keywords (*paraprofessional* or *facilitator* or *partner* or *paraeducator* or *assistant* or *staff* or *career*) and (*augmentative and alternative communication* or *communication*) and (*training* or *education* or *collaboration).* Next, ancestral searches of articles meeting inclusion criteria were conducted. Then author searches were conducted for authors (i.e. Kent-Walsh, Light, McNaughton, Schlosser, Sigafoos, Soto, and Wood) for whom multiple articles were found in previous searches focusing on training communication partners to support individuals using AAC. Lastly, hand searches were conducted in the following peer-reviewed journals*: Augmentative and Alternative Communication; Research and Practice for Persons with Severe Disabilities* (formerly *JASH*); *Education and Training in Developmental Disabilities;* and *Language, Speech, and Hearing Services in Schools.* Journals were selected for a hand search when multiple articles were found in previous searches focusing on training communication partners to support individuals using AAC within these journals. Searches yielded seven studies that met all inclusion

criteria.

Results

Results of this literature review are presented in accordance with the stated research questions: (1) description of studies including demographics of paraeducators and individuals using AAC, setting, study design, and data collection methods; (2) content and format of trainings in studies; (3) instructional procedures included in training sessions; (4) outcomes for paraeducators; and (5) communication outcomes for individuals using AAC.

Description of Research Studies

Paraeducator demographics. The number of participants within studies ranged from 3 to 18. Sixty-three individuals participated in the seven studies; 62 of these individuals were paraeducators (see Table 1) and the remaining participant was a teacher participating in a study with paraeducators (Duker & Moonen, 1985). Paraeducator and program staff education levels varied from high school or equivalent through graduate student level. Paraeducator experience ranged from no experience to over 5 years of experience. Participant roles included: instructional aides, personal attendants, group home staff, day program staff, volunteer staff, health attendants, and habilitation aides.

Individuals using AAC. A total of 41 individuals using AAC were included in the studies. Age, disability, and type of AAC used are presented in Table 2. Age for individuals using AAC ranged from 4 to 26. The disabilities of the individuals using AAC included autism, intellectual disability, cerebral palsy, multiple disability, and traumatic brain injury. Type of AAC system varied among individuals and included speech generating devices (SGD), picture symbols, sign, gestures, and/or objects.

Setting. Studies were conducted in a number of settings including inclusive classrooms, self-contained classrooms, residential facilities, adult day programs, and community settings (see Table 1). Four studies (Bingham, Spooner, & Browder, 2007; Money, 1997; Schlosser, Walker, & Sigafoos, 2006; Seys, Kersten, & Duker, 1990) were conducted in a single setting. Two studies provided data collected in two settings (Binger, Kent-Walsh, Ewing, & Taylor, 2010; Duker & Moonen, 1985). One study (Light, Datillo, English, Gutierrez, & Hartz, 1992) was conducted in a variety of community settings.

Table 1

Characteristics of Paraeducator and Program Staff in Studies

Study	*n*	Setting	Education level	Ages	Experience
Binger, Kent-Walsh, Ewing, & Taylor (2010)	3	Self-contained classroom & inclusive classroom	College, Graduate student	---	3-5 years
Bingham, Spooner, & Browder (2007)	3	Self-contained classroom	HS, GED	20, 23, 52	2 ½ - 5 years
Duker & Moonen (1985)	12[a]	Self-contained classroom & residential program	---	21-32	---
Light, Dattilo, English, Gutierrez, & Hartz (1992)	3	Community settings	Undergraduate, Graduate student	20, 29, 25	0 - 2 years
Money (1997)	18	Adult day program	---	---	---
Schlosser, Walker, & Sigafoos (2006)	7	Residential program	HS, College	---	1-5 years
Seys, Kersten, & Duker (1990)	17	Residential program	---	---	---

Note. Dashes indicate information was not provided in the study. HS=High School Diploma; GED=High School Equivalency.
[a]1 participant in this study was a teacher, the remaining 12 were paraeducators.

Table 2

Characteristics of Individuals Using AAC in Studies

Study	*n*	Age(s)	Gender	Disability	Type of AAC
Binger, Kent-Walsh, Ewing, & Taylor (2010)	3	4, 5, 6	2M, 1F	ID, CP	SGD, gestures, sign, PECS
Bingham, Spooner, & Browder (2007)	3	8, 12, 16	2 F, 1 M	ID, multiple disability	Picture symbols, Big Mac
Duker & Moonen (1985)	3	11, 13, 14	2 F, 1 M	ID	Sign
Light, Dattilo, English, Gutierrez, & Hartz (1992)	2	18, 26	2 F	TBI, CP/ID	SGD
Money (1997)	18	---	---	---	Sign, picture symbol
Schlosser, Walker, & Sigafoos (2006)	3	7-10	3 M	Autism, ID	Objects (reach or lead to objects)
Seys, Kersten, & Duker (1990)	9	9-26	7 F, 2 M	ID	Gestures

Note. Dashes indicate information was not provided in the study. F=Female; M=Male; ID=Intellectual/ developmental disability; CP= Cerebral Palsy; SGD= speech generating device; PECS= Picture exchange communication system.

Study design. Two types of research designs were used among studies. Six studies used a single subject multiple-baseline design (Binger et al., 2010; Bingham et al., 2007; Duker & Moonen, 1985; Light et al., 1992; Schlosser et al., 2006; Seys et al., 1990). Two of the multiple-baseline studies were replicated across groups (Schlosser et al., 2006; Seys et al., 1990), three were replicated across participants (Binger et al., 2010; Bingham et al, 2007; Light et al., 1992), and one was replicated across settings (Duker & Moonen, 1985). One study (Money, 1997) used an experimental group design.

Data collection. Within studies, data were collected using direct observation or video analysis. Direct observation for data collection occurred in three studies (Bingham et al., 2007; Duker & Moonen, 1985; Seys et al., 1990) and involved direct observation of communication interactions between paraeducators and individuals using AAC (e.g., prompts, use of AAC). Reliability checks between observers also occurred in these three studies (Bingham et al., 2007; Duker & Moonen, 1985; Seys et al., 1990). Data collection using video analysis took place in four studies and each of these studies also reported data on reliability checks with a mean of 80% to 100% reported in sessions (Binger et al., 2010; Light et al., 1992; Money, 1997; Schlosser et al., 2006). In three studies (Binger et al., 2010; Light et al., 1992; Seys et al., 1990), reliability checks occurred over multiple observation sessions and occurred in 10% to 29% of all observation periods.

Paraeducator Training

Training content. Information regarding training content is provided in Table 3. All but one study

(Binger et al., 2010) stated communication functions were covered in training. Other training topics included information about AAC systems, goal setting, creating opportunities to communicate (e.g., prompting, responding), and supporting participation. In four studies (Binger et al, 2010; Light et al., 1992; Schlosser et al, 2006.; Seys et al., 1990) authors provided trainings. Three studies did not specify who conducted the training (Bingham et al., 2007; Duker & Moonen, 1985; Money, 1997).

Training format. Information was often provided in studies regarding training duration and length (see Table 4). Training sessions varied from multiple 15-minute sessions to a 1-day workshop. One study did not specify the number of training sessions (Binger et al., 2010).

In one study (Binger et al., 2010) length of training sessions was not reported. The number of training sessions in other studies ranged from 1 to 20. Duration of the training varied in studies from 1 day to 14 months. Six studies (Binger et al., 2010; Bingham et al., 2007; Duker & Moonen, 1985; Light et al., 1992; Schlosser et al., 2006; Seys et al., 1990) did not report training duration.

Instructional components of trainings. Instructional components provided within the studies were analyzed and compared to the eight-stage Communication Partner Instruction model (Kent-Walsh & McNaughton, 2005; see Table 5). All but one study (Seys et al., 1990) included at least 5 of the 10 stages in the model. Seys and colleagues implemented three stages of training (i.e. pretest, strategy description, and practice and

Table 3
Communication Partner Training

Study	Instructor	Training content				
		Comm. functions	AAC systems	Goal setting	Creating opportunity	Supporting participation
Binger, Kent-Walsh, Ewing, & Taylor (2010)	First author			X	X	X
Bingham, Spooner, & Browder (2007)	---	X	X			X
Duker & Moonen (1985)	---	X			X	X
Light, Dattilo, English, Gutierrez, & Hartz (1992)	First author	X	X	X	X	X
Money (1997)	---	X	X		X	
Schlosser, Walker, & Sigafoos (2006)	First/second author	X			X	X
Seys, Kersten, & Duker (1990)	First author	X			X	X

Note. Comm. = Communication. X indicates content was included in training.

feedback). One study (Binger et al., 2010) utilized all stages of the model. The stages most often included in studies were: *pretest, strategy description, strategy demonstration, controlled practice and feedback, advanced practice and feedback, and post test*. All studies included pretest measures during training and provided a description of the strategy included in training. All but one study (Seys et al., 1990) provided a demonstration of the targeted strategy and stated that participants were provided with controlled practice and feedback (e.g., modeling, role play). Advanced practice and feedback was included in 5 of the 7 studies and posttest measures were provided in 4 of 7 studies (see Table 5).

Several stages (e.g., commitment, verbal practice, and generalization) were often omitted in studies. The study by Binger et al. (2010) was the only study to include commitment to instructional program, verbal practice, and commitment to long-term strategy use. Three studies (Binger et al., 2010; Duker & Moonen, 1985; Light et al., 1992) reported data on the generalized use of communication strategies for paraeducators.

Outcomes for Participants

Outcomes for paraeducators. Behavioral changes (e.g., increase in prompting, increase in responses to requests, increased opportunities for AAC use, decreased use of closed questions) for paraeducators were reported in all seven studies (see Table 4). Four studies reported that after training, paraeducators provided more opportunities for individuals using AAC to communicate (Binger et al., 2010; Duker & Moonen, 1985; Light et al., 1992; Schlosser et al., 2006). One study (Bingham et al., 2007) indicated that after training paraeducators increased prompts to individuals using AAC. In the study by Money (1997) specific types of communication were measured. Open ended questions and multi-utterances increased while closed questions and statements decreased for the combination group. The direct and teaching groups reported mixed results (see Table 4). Seys (1990) also reported mixed group results, but noted an increase in prompting by paraeducators after training in 2 of 3 groups.

Four studies (Binger et al., 2010; Bingham et al., 2007; Light et al., 1992; Seys et al., 1990) provided maintenance data for paraeducators. Data were collected anywhere from 2 weeks after training up to 12 months after training. One study (Seys et al., 1990) did not specify the length of time between training and collection of maintenance data. Studies reported mixed outcomes in maintenance data. Two studies (Bingham et al., 2007; Light et al., 1992) indicated behavior levels for paraeducators maintained, while one study (Seys et al., 1990) stated behavior levels decreased when maintenance data were collected. One study (Binger et al., 2010) noted mixed results for maintenance data with two paraeducators maintaining communication interaction skills and one decreasing.

Outcomes for individuals using AAC. Overall, changes in paraeducator behavior appear to be associated

Table 4
Summary of Communication Outcomes

Study	Training format[a]	Dependent variable for paraeducators	Results for paraeducators	Outcomes for individuals using AAC
Binger, Kent-Walsh, Ewing, & Taylor (2010)	---,---,---	a) Strategy: model, ask questions, prompt, respond	a) Increased use of strategy for all	• Increase in frequency of multi-symbol messages for all
Bingham, Spooner, & Browder (2007)	4, 2 ¼ hours, ---	a) Prompts provided b) Responses to requests	a) Increase for all b) Increase for all	• Increase in AAC use for all • Decrease in problem behavior for all
Duker & Moonen (1985)	2, 1 hour, ---	a) Opportunities for comm.	a) Increase for all	• Increase in signing for all
Light, Dattilo, English, Gutierrez, & Hartz (1992)	4, 1 hour, ---	a) Conversational reciprocity	a) Increase for all	• Increase in comm. turns for all • Slight increase in initiations for all
Money (1997)	Direct: 6, 1 hour, 4 months Teaching: 5, 1 day, 2 months Combination: 11, ½ day, 4 months	a) Open Questions b) Closed questions c) Statements d) Multi-utterances	a) Increase for all b) Decrease for direct/teaching Increase for combination c) Decrease for teaching/ combination Increase for direct d) Increase for all	For combination group: • Increase in yes/no, and responses, number of responses, use of additional modalities • Decrease in number of non-responses
Schlosser, Walker, & Sigafoos (2006)	1, 1 day, ---	a) Opportunities provided for comm.	a) Increase for all	• Increase in requests for all
Seys, Kersten, & Duker (1990)	20, 15 min., ---	a) Prompts	a) Increase in 2 groups, no change in one group	• Increase in prompted (7 of 9), spontaneous (8 of 9), and different gestures (all)

Note. Dashes indicate information was not provided in the study. comm. = communication; [a]Number of sessions, average session length, total duration.

with improved or increased communication for individuals with CCN. All studies (see Table 4) reported increased and/or improved communication for individuals using AAC. Increased use of AAC was found in five studies (Bingham et al., 2007; Duker & Moonen, 1985; Money, 1997; Scholsser et al., 2006; Seys et al, 1990). Additionally one study (Light et al., 1992) noted an increase in initiations by the individual using AAC. Light et al. (1992) also noted an increase in response complexity (e.g., multiword responses). Binger et al.

Table 5

Inclusion of Targeted Instructional Procedures [as listed in Kent-Walsh & McNaughton, 2005]

	Communication Partner Instruction Stages									
Study	1a	1b	2	3	4	5	6	7a	7b	8
Binger, Kent-Walsh, Ewing, & Taylor (2010)	I	I	I	I	I	I	I	I	I	I
Bingham, Spooner, & Browder (2007)	I	---	I	I	---	I	I	I	---	---
Duker & Moonen (1985)	I	---	I	I	---	I	---	---	---	I
Light, Dattilo, English, Gutierrez, & Hartz (1992)	I	---	I	I	---	I	I	I	---	I
Money (1997)	I	---	I	I	---	I	---	I	---	---
Schlosser, Walker, & Sigafoos (2006)	I	---	I	I	---	I	I	---	---	---
Seys, Kersten, & Duker (1990)	I	---	I	---	---	---	I	---	---	---

Note. Dashes indicate it was unclear if the stage was included in the study. 1a = Pretest; 1b = Commitment to instructional program; 2 = Strategy description; 3 = Strategy demonstration; 4 = Verbal practice of strategy steps; 5 = Controlled practice and feedback; 6 = Advanced practice and feedback; 7a = Post test; 7b = Commitment to long-term strategy use; 8 = Generalization of targeted strategy use; I = stage included

(2010) similarly noted an increase in multi-symbol messages.

One study focused on replacing problem behaviors with communication behaviors (Bingham et al., 2007). In this study, additional data were provided about problem behaviors (e.g., self-stimulation, aggression, self-injury, disruption) for individuals using AAC. After paraeducator training, a decrease was noted in problem behaviors as well as an increase in communication.

In four studies (Binger et al., 2010; Bingham et al., 2007; Light et al., 1992; Seys et al., 1990), maintenance data were collected regarding communication for individuals using AAC. AAC use was maintained from 2 weeks up to 12 months after the end of the intervention in three studies (Binger et al., 2010; Bingham et al., 2007; Light et al., 1992). Seys et al. (1990) did not specify when maintenance data were collected. One study (Bingham et al., 2007) noted participants maintained level of AAC use after intervention. The remaining studies (Binger et al., 2010; Light et al., 1992; Seys et al., 1990) noted mixed results during maintenance. For some participants levels

remained steady, for others levels decreased, and for some levels increased after intervention.

Discussion

Results of this review add to past reviews in communication partner training and provides evidence of the importance of communication partner training for paraeducators supporting individuals who use AAC. In all seven studies (see Table 4) implementation of strategies by paraeducators affected communication. Specifically, when paraeducators increased use of targeted strategies (e.g., prompting, responding to requests by individuals using AAC), communication increased (Bingham et al., 2007; Duker & Moonen, 1985; Money, 1997; Schlosser et al., 2006; Seys et al., 1990) or improved (Binger et al., 2010; Light et al., 1992). Two studies reported mixed results for paraeducators (Money, 1997; Seys et al., 1990), but still noted an increase in communication for most individuals using AAC. From this review, there is initial support to indicate that training for paraeducators who support individuals using AAC may be beneficial in changing paraeducator behavior and may affect communication by individuals with CCN.

Paraeducator Training

Training outcomes. All studies (see Table 4) provided evidence that training increased use of communication strategies by paraeducators. However, two studies reported mixed results (Money, 1997; Seys et al., 1990) for paraeducators and individuals using AAC. Additionally, when strategies (e.g., prompting, responding to requests by individuals using AAC) were implemented by paraeducators an increase (Bingham et al., 2007; Duker & Moonen, 1985; Money, 1997; Schlosser et al., 2006) or improvement in AAC use was shown (Binger et al., 2010; Light et al., 1992). This seems to confirm existing research that indicates proper implementation of treatment is associated with later positive outcomes (Gresham, 1989).

Positive changes for individuals using AAC were noted in all studies. The majority of individuals using AAC demonstrated behavior change as a result of the changes implemented by paraeducators after training. However, a small number of participants in two studies (Money, 1997; Seys et al., 1990) did not demonstrate growth. This may be due to lack of implementation of the trained communication strategies by paraeducators. In both studies (Money, 1997; Seys et al., 1990) data were reported at the group level for paraeducators and did not connect the paraeducator data to the individuals they were assisting, so it is difficult to make this connection definitively.

Instructional strategies used in paraeducator training. The reviewed studies included many components from the Communication Partner Instruction model (Kent-Walsh & McNaughton, 2005) for AAC training (see Table 5). Six of the stages were most often included in studies: *pretest, strategy description, strategy demonstration, controlled practice and feedback, advanced practice and feedback,* and *post test.* Four components were most often omitted in studies: *commitment to initial use, verbal practice, commitment to long-term use*, and *generalization.* In the future, it may be beneficial to include these components. Gersten et al. (1997) suggested that commitment assists acquisition of new skills by allowing individuals to recognize skills that are not fully developed or areas that need improvement and leads to continued use of trained strategies after instruction is over. Therefore, commitment at both initial and final stages of training should be considered. In addition, reviews of effective educational practice suggest that verbal practice in the steps of a strategy assist learners acquire new skills and gain automaticity so they can focus on the strategy rather than trying to remember the steps (Rosenshine & Stevens, 1986). Regarding generalization, Ellis et al. (1987) emphasized the importance of this component when learning new skills, as many learners do not make use of new strategies in novel situations. By incorporating a generalization

component, use of the strategy in a variety of settings is encouraged.

Although the majority of studies implemented six of the stages of training (i.e. *pretest, strategy description, strategy demonstration, controlled practice and feedback, advanced practice and feedback, post test*) from the Communication Partner Instruction model (Kent-Walsh & McNaughton, 2005), one study (Seys et al., 1990) implemented only three stages (i.e. pretest, strategy description, advanced practice, and feedback). Seys et al. (1990) also reported inconsistent rates of improvement for paraeducator groups after training.

It should be noted that use of the communication partner instruction model (Kent-Walsh & McNaughton, 2005) to evaluate current paraeducator communication training studies is not meant to imply there is only one way to provide or evaluate paraeducator training in communication partner skills. Indeed other researchers (e.g., Granlund) have recommended slightly different approaches (i.e. modeling of collaborative problem solving approaches) for training communication partners and evaluating training (Kirkpatrick, 1996; see Smidt et al., 2009). However, based on the results of this review, it appears components of strategy instruction exist within reviewed studies, which indicates that strategy instruction may be a promising approach for teaching communication partner skills.

Limitations

Several limitations were noted in this literature review. First, the review included only seven studies. Although this is an important area of research, limited research exists. In addition, most of the studies reviewed were single subject designs. Although single subject designs provide information about the effectiveness for an individual, this information cannot be generalized to other individuals without further replication or more rigorous research (Johnston & Pennypacker, 2009). Given these limitations, additional research is required to strengthen the findings of this review and to confirm the impact of paraeducator training to support the communication of individuals who use AAC.

Future Research Directions

Although the use of paraeducators to support individuals using AAC has been demonstrated, this review suggests that limited research exists on the topic. As such, any research in the area of training and implementation of effective communication strategies by paraeducators supporting individuals who use AAC should be encouraged. Future research should continue to address how paraeducator training impacts individuals who use AAC. Replication of included studies could be conducted to determine if the findings from reviewed studies are generalizable to other settings, students, and paraeducators. In addition, new studies could be designed which address limitations of studies included here (e.g.,

study design).

Future research in the area of paraeducator training to support the communication of individuals using AAC could also be conducted to determine what instructional procedures are most essential in communication partner training to paraeducators. This could be done using the training model suggested by Kent-Walsh and McNaughton (2005), or through investigation of communication partner training curriculums. Considering only one study included all of the components from the Communication Partner Instruction model, future research could also be conducted to analyze the essential components needed in training by looking at the variance in outcomes when some instructional components are not included.

Summary

This review of training practices provides evidence that training for paraeducators to improve communication supports for individuals with CCN can be effective. Educational settings and organizations supporting individuals with CCN typically must address a number of questions when planning communication training for paraeducators. Organizations will likely consider the effectiveness, efficiency, and appropriateness of training for paraeducators and individuals who use AAC. This review demonstrates that paraeducator communication training can be effective and appropriate to the needs of paraeducators and individuals with CCN. In addition, it should be noted that trainings in these studies often were efficient. Training frequently was provided with just a few sessions (Bingham et al., 2007; Light et al., 1992), over short periods of time (Schlosser et al., 2006) or using short training sessions (Light et al.; Seys et al., 1990). Despite the brevity of training sessions, positive outcomes were demonstrated in studies. This indicates that trainings may not need to be lengthy, over long periods of time, or include more than a few sessions to produce change for the communication behavior of paraeducators and individuals with CCN.

In addition, given the high turnover rate for paraeducators working with individuals using AAC (Dobson, Upadhyaya, & Stanley, 2002; Giangreco et al., 2001), it is important for organizations to consider the need for ongoing training as new personnel are hired, or as personnel change placements to work with other individuals (Calculator & Luchko, 1983). Furthermore given some of the concerns with maintaining skills, ongoing training may assist maintenance of communication outcomes.

Although research in this area is limited, this review provides support for use of paraeducator training to support the communication development of individuals with CCN. Trainings that included strategy instruction components (e.g., pretest, strategy description, controlled practice and feedback) lead to the use of effective use of communication strategies by paraeducators (e.g.,

prompting, recognizing communicative attempts, responding to communicative attempts). When paraeducators used these techniques, benefits were also noted for individuals with CCN (e.g., increased AAC activation, increased response complexity, increased initiations). Given that support exists for paraeducator communication partner training, best practice would indicate that well designed training should be provided to paraeducators supporting individuals with CCN.

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