

## **Functional Communication Training: A Review of the Literature Related to Children with Autism**

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*Abstract: Numerous researchers have employed functional communication training (FCT) to address both the communication and behavioral needs of children with autism. Thus, the purpose of this review is to examine FCT, particularly, the environments and individuals involved in the training and the effectiveness of FCT with children who have a diagnosis of Autism Spectrum Disorder (ASD) and to provide suggestions for practitioners and researchers. FCT consistently reduces challenging behavior and increases communication; however, the majority of research is clinically based and focuses on one communication mand. Future research teams should address maintenance and generalization by training teachers in classrooms and parents in homes while collecting data across time.*

Autism is a developmental disorder affecting the lives of thousands of children. According to the Centers for Disease Control and Prevention (CDC), approximately 34 in 10,000 children ages 3 to 10 years of age have autism (CDC, 2004). The Autism Society of America (ASA) reports that 1 in 166 babies born today will develop autism. The ASA also notes that 1.5 million Americans including children and adults have autism, while another 15 million Americans (e.g., family, educators, and health care workers) are affected by autism.

The essential features of autism include a significant impairment in social interaction and communication and a highly restricted area of activities and interests (American Psychiatric Association, 2000). Concurrent with these features, children with autism exhibit high levels of challenging behaviors such as screaming, hitting, and biting (Sigafoos, 2000), thus, creating substantial obstacles for individuals charged with their education and well being (Durand & Merges, 2001). For example, many parents experience stress when their children engage in tantrums. Unlike other parents, parents of children with autism

usually cannot determine the reason for the tantrum because of their child's deficits in communication. Such issues with communication deficits and challenging behaviors combined with the increase in the prevalence of autism demands for the field of behavior disorders to respond and provide evidence-based practices to meet these children's needs at home and in educational settings.

Several researchers have responded by looking at challenging behaviors and their relationship with communication abilities (e.g., Bott, Farmer, & Rhode, 1997; Chung, Jenner, Chamberlain, & Corbett, 1995; Sigafoos, 2000; Schroeder, Schroeder, Smith, & Dalldorf, 1978). Chung et al. found an inverse relation between communication ability and the display of challenging behaviors such as self-injury and aggression. Similarly, Bott et al. (1997) discovered that individuals with more developed speech skills had a lower frequency of challenging behaviors than those with impaired speech. Further, Sigafoos hypothesized in a more recent study that impaired communication development causes challenging behaviors.

To address both the communication and behavioral needs of children with autism, several researchers employed functional communication training (FCT) (Carr & Durand, 1985; Durand & Merges, 2001; Wacker et al., 1990). Developed in the mid-1980s, FCT in-

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volves assessing the function of a behavior (e.g., attention, escape, tangible, or sensory) through functional behavior assessments (FBA) and then replacing the challenging behavior with a communicative response that serves the same function.

FBA typically consists of interviews, direct observations, and functional analyses (Brady & Halle, 1997). Interviews involve asking teachers, parents, and other caregivers communicative and behavioral-related questions. The next step consists of directly observing the behavioral and communicative behaviors of the children in various natural settings such as the classroom and playground. Both of these steps aid in developing a hypothesis of the behavior's function. Finally, the trainer completes a functional analysis (FA) by manipulating variables such as demands, attention, and tangible items to see if performing the challenging behavior allows the child to escape the difficult task or gain attention.

After completing the FBA process, trainers must identify a communicative response. This communicative response may consist of a response from one of the following categories: verbal language, picture communication, gestures, or assistive technology devices (Brady & Halle, 1997). The selection of this response should be based on the child's capability of completing the response, the ease of teaching the response, the acknowledgement from others of the response, and how quick the response serves its function (Dunlap & Duda, 2005; Horner & Day, 1991).

After the response selection, the actual communicative response should be taught (Lalli, Casey, & Kates, 1995). For example, a child may be taught to say, *help* for assistance (i.e., obtaining attention) instead of screaming for help. Also, a child may be taught to give a picture of a requested item (i.e., obtain a tangible) to the teacher for access to the item instead of screaming or hitting to gain the tangible. In both cases, the instructor must ensure mastery of the response before proceeding further.

The final step in FCT involves ignoring the challenging behavior (i.e., the use of extinction) and prompting and acknowledging the use of the communicative response that replaces the challenging behavior (Lalli et al., 1995). For example, while ignoring a tantrum

a teacher may prompt a child to ask for a break and then provide the break after the child responds with the appropriate communicative response. Researchers purport that this process increases communication and decreases challenging behaviors (Carr & Durand, 1985; Durand & Merges, 2001; Wacker et al., 1990). The majority of the FCT research, however, has been conducted with children with severe or profound disabilities (e.g., severe, profound mental retardation), not individuals solely identified as having autism, thus, making it difficult to generalize the findings to children with autism. To complicate matters, there is little research on training parents and teachers how to use FCT and most of the research is from clinical type settings, not less structured settings like typical classrooms and homes. Thus, the purpose of this review is to examine functional communication training, particularly, the environments and individuals involved in the training and the effectiveness of FCT with children who have a diagnosis of Autism Spectrum Disorder (ASD). First, analyses of the characteristics of the participants, environment, research designs, behaviors, interventions, major findings, reliability, and treatment fidelity across studies are provided. Second, a critique of the findings to address limitations and implications for future researchers are provided.

## Method

The literature review consisted of searches of ERIC, Education, PsycINFO, and Academic Search Premier data bases using various combinations of the following terms: functional communication training, functional equivalence training, autism, autism spectrum disorder, and communication. Then a hand search was conducted of the following journals, covering the span of 1985 to the present: *Focus on Autism and Other Developmental Disabilities*, *Journal of Autism and Developmental Disorders*, *Journal of Applied Behavior Analysis*, and *Journal of Positive Behavior Interventions*. Finally, after reviewing the retrieved articles, an archival search was conducted. These searches produced 30 articles in which FCT was the primary intervention addressing challenging behaviors and communication deficits. The

following criteria were used for inclusion in this review: (a) at least one participant of the study was a child with an autism spectrum disorder diagnosis, (b) the function of the challenging behavior was determined by the functional behavior assessment (FBA) process, and (c) the primary intervention was functional communication training.

Although some studies included children and adults with varying disabilities, only the children diagnosed with ASD were included in the analyses. From the list of 30 articles initially identified, eight studies were identified in which all participants had received prior diagnoses of autism. For each study, characteristics of the participants, research environment, research designs, behaviors, interventions, major findings, reliability, and treatment fidelity were identified. These data are presented in Tables 1, 2, 3, and 4.

## Results

### *Characteristics of Study Participants*

The majority of researchers reported gender along with chronological, language, and mental ages. Eighteen of the participants were male and four were female. Although this may at first seem overrepresented by males, it represents the overall population of individuals diagnosed with autism (Autism/Pervasive Developmental Disorders' Newsletter, 2003). As shown in Table 1, participants ranged in age from 2.7 to 13 years, with the average age being 8 years. The language age reported ranged from 1.8 to 13.3 years, while the mental age reported ranged from 2.4 to 7.9 years. Based on this data, it can be inferred that no relationship exists between chronological, mental, and language age when compared across participants. For example, a participant with a low chronological age could have a language and mental age higher than that of an older participant. Also, while some participants had a mental age greater than their language age, other participants' ages were opposite in correlation.

Participants differed in their levels of language prior to the studies and whether or not they had concomitant diagnoses. Of the 12 prior speech levels reported, five participants (42%) spoke in complete sentences; however,

their sentences were not always functional. For example, some of the complete sentences were echolalic (i.e., repeated phrase over and over), while others were bizarre (e.g., The cat flew on a broom.). Also, of the individuals who spoke in complete sentences, only 1 (10%) was reported to speak spontaneously. Two participants (16%) were nonverbal and did not communicate with signs or gestures. Of all these participants, only six (27%) were reported to have additional diagnoses, which included communication disorders, seizure disorders, and severe/profound mental retardation.

### *Characteristics of Environment*

With a few exceptions and unlike participant characteristics, the environmental context of the studies was similar. As shown in Table 2, researchers and research assistants implemented the majority of studies. Only one study (12.5%) involved a teacher as an implementer, and she was not the participant's teacher, that is, she acted more as a research assistant (Wacker et al., 1990). Further, only one study (12.5%) used parents as trainers (Wacker et al., 2005). Similarly, training occurred in clinic rooms. For example, the majority of training (i.e., 6 studies, which is 75%) occurred in separate rooms that usually contained only a table and chairs. Two studies (25%), however, were conducted in more natural environments. For example, O'Neill and Sweetland-Baker (2001) conducted their study in various locations of the participant's classroom while Wacker et al. conducted training in designated rooms of the participant's home.

### *Characteristics of Research Designs, Behaviors, and Interventions*

Challenging behaviors and their functions varied among participants. Consequently, researchers implemented various interventions to address these functions. Specifically, differences identified across the studies can be organized in the following categories: (a) challenging behaviors, (b) FBA procedures and designs, (c) behavior functions, (d) communicative responses, and (e) FCT research designs.

**TABLE 1**  
**Characteristics of the Study Participants**

<i>Study</i>	<i>N</i>	<i>CA *</i>	<i>LA *</i>	<i>MA *</i>	<i>M</i>	<i>F</i>	<i>Diagnosis</i>	<i>Prior Speech Level</i>
Carr & Durand (1985)	1	13	N/A	3	1	0	Autism	Verbal (complete sentences)
Durand & Carr (1987)	4	7-13	3.3-7.7	3-7.9	4	0	2- Autism; 2- PDD	Verbal (echolalia, complex sentences, bizarre speech) N/A
Durand & Carr (1992)	3	3.8-4.9	1.8-3.8	2.4-4.4	2	1	Autism	Nonverbal
Martin et al. (2005)	1	10	N/A	N/A	1	0	Autism	Verbal (non-functional)
O'Neill & Sweetland-Baker (2001)	2	6-15	N/A	N/A	2	0	Autism	Verbal
Ross (2002)	3	9-14.8	7-13.3	N/A	1	2	Autism	None
Wacker et al. (1990)	1	7	N/A	N/A	1	0	Autism	N/A
Wacker et al. (2005)	7	2.7-6.5	N/A	N/A	6	1	3- Autism; 4- PDD	N/A
Total	22	m = 8	m = 5.7	m = 4.1	18	4		
Range		(2.7-15)	(1.8-13.3)	(2.4-7.9)				

*Note.* CA = chronological age; LA = language age; MA = mental age; N/A = not available; MR = mental retardation; func. = functional; M = male; F = female; m = mean  
 \* age in years/months

**TABLE 2**

**Characteristics of the Environment**

<i>Study</i>	<i>FCT Implementer</i>	<i>FCT Training Location</i>	<i>Description of Location</i>
Carr & Durand (1985)	Researcher	Separate Class	5 × 10-m classroom next door
Durand & Carr (1987)	Researcher/ Assistants	Separate Class	Contained table, two chairs
Durand & Carr (1992)	Research Assistants	Separate Class	Table, chairs for trainer, children
Martin et al. (2005)	Researcher	Separate Class	N/A
O'Neill & Sweetland-Baker (2001)	Researcher	Various class locations	N/A
Ross (2002)	Researcher	Separate Class	Table, bookshelf, 3 chairs
Wacker et al. (1990)	Therapist, graduate students, 1 teacher	Standard classroom/ therapy room	Therapy room had table, chairs
Wacker et al. (2005)	Children's parents	Room at home	N/A

*Note.* N/A = not available.

*Challenging behaviors.* Teachers and parents identified 8 different categories of challenging behaviors, with many participants exhibiting more than one behavior. The categories included aggression (e.g., hitting, hair pulling), self-injurious behavior (e.g., hand biting), destroying property, tantrums (e.g., yelling), body rocking, hand flapping, oppositional behavior (e.g., refuse to do work), and walking away. Fourteen participants (64%) exhibited aggression, self-injurious behavior, or destruction of property. Also, fourteen participants (64%) exhibited more than one challenging behavior. For example, one participant engaged in aggressive behavior, tantrums, self-injurious behavior, and property destruction (Carr & Durand, 1985).

*FBA procedures.* Basic FBA procedures used to analyze various behaviors were fairly similar across all studies. First, information was collected through interviews with teachers or parents, however interviews used in various studies differed in length. While some researchers reported interviews that were pages long, others reported interviews as short as one to two questions. Next, direct observations were conducted to further aid in developing a hypothesis of the behavior's function. Finally, a functional analysis (FA) was conducted to determine the function. However, designs used for the FA differed. As shown in Table 3, five research teams used alternating treatment

designs where the assessment conditions were systematically alternated. For example, Carr and Durand (1985) alternated easy versus difficult tasks and a low (33%) versus high (100%) attention condition. Similarly, Wacker et al. (1990) alternated escape, tangible, alone, and social attention conditions. Durand and Carr (1987; 1992) used a reversal design to examine effects of different conditions. Wacker et al. (2005) used a multi-element design to compare assessment conditions (i.e., attention, escape, tangible, and free play) by counterbalancing them across sessions.

*Behavioral functions.* After the completion of the FBA procedures, behavioral functions were definitively identified in each study for all but one participant (Wacker et al., 2005) whose behavioral function was determined to be undifferentiated. Across all the studies, 12 participants (55%) emitted challenging behaviors to escape a task or situation, while eight participants (36%) displayed challenging behaviors to gain attention. Only three participants (14%) engaged in challenging behaviors to gain a tangible. Also, of the 12 participants whose behavioral function was escape, four of them (18%) also engaged in the behavior to gain attention. Similarly, one participant (5%) who engaged in challenging behaviors did so to gain attention and to gain access to a tangible object.

**TABLE 3**

**Research Designs and Interventions**

<i>Study</i>	<i>FCT Design</i>	<i>FBA Procedures</i>	<i>Dependent Measures</i>	<i>Function</i>	<i>Response</i>
Carr & Durand (1985)	Reversal	I, O, FA Alt. Tx	AG, TAN, SIB, DP	E	Verbal
Durand & Carr (1987)	Multiple Baseline	I, O, FA Alt. Tx	2-BR; 2-HF	E	Verbal
Durand & Carr (1992)	Multiple Baseline	I, O, FA Alt. Tx	2-DP; 2-OP; TAN	A	Verbal
Martin et al. (2005)	Reversal	FA Alt. Tx	TAN, AG, W	E	Picture Card
O'Neill & Sweetland-Baker (2001)	Multiple Baseline	FA Alt. Tx	2-W; 1-DP; 1-SIB	E	Verbal
Ross (2002)	Reversal	FA Alt. Tx	no or poor initiation	1-A, 1-E, 1-T	Verbal
Wacker et al. (1990)	Reversal	FA Alt. Tx	SIB	T	Sign language
Wacker et al. (2005)	Multiple Baseline	FA multiple Element design	6-AG; 4-SIB; 3-DP	4-A & E; 1-A & T; 1-U	Signs, Pictures, Verbal, Assistive Technology

*Note.* AG = aggressive behavior; SIB = self-injurious behavior; DP = destroying property; OP = oppositional; TAN = tantrum; W = walk away; FCT = functional communication training; FA = functional analysis; FBA = functional behavioral assessment; HF = hand flapping; BR = body rocking; N/A = not available; I = interview; O = observation; Alt. Tx = alternating treatment; A = attention; E = escape; T = tangible; U = undifferentiated

**TABLE 4**

**Major Findings**

<i>Study</i>	<i>Tx Fidelity</i>	<i>Inter Rater Reliability</i>	<i>Behavioral Results</i>	<i>Communication Results</i>
Carr & Durand (1985)	High	80% or higher	DB decreased to 0.5%	Relevant responses maintained
Durand & Carr (1987)	High	80% or higher	Reduction in HF, BR exhibited following training	Communication increased
Durand & Carr (1992)	High	N/A	Decreased, maintained best in FCT/time-out	Unprompted communication
Martin et al. (2005)	High	97–99%	Bear hugging decreased	Independently after A phase.
O'Neill & Sweetland-Baker (2001)	High	87–99%	Disruptive behavior decreased	Stimulus generalization occurred across some tasks
Ross (2002)	High	88–100%	N/A	Faulty responses decreased
Wacker et al. (1990)	High	92% average	FCT w/time-out resulted in hand biting decreasing to 0%	Signing was maintained
Wacker et al. (2005)	High	90–100%	Behaviors decreased for all participants ranging from 66.25% to 100% reduction	Manding increased

*Note.* Tx = treatment; HF = hand flapping; BR = body rocking; N/A = not available; FCT = functional communication training; Db = disruptive behavior

*Communication responses.* With the knowledge of the behavioral function(s), trainers taught an array of communicative responses to replace the challenging behaviors, with equal success regardless of the response category. Responses taught aligned with the identified function and fit into one of the following categories: (a) verbal language, (b) sign language, (c) picture icon based language, or (d) augmentative devices. As shown in Table 3, trainers in six studies taught participants to verbally mand. For example, Durand and Carr (1987) taught participants to verbally mand, *Help me* to replace body rocking and hand flapping that served to escape aversive tasks and situations. Durand and Carr (1992) taught participants in another study to verbally mand, *Am I doing good work?* to replace tantrums that served to gain attention. Two research teams taught students to use sign language for manding (Wacker et al., 2005; Wacker et al., 1990). For example, to gain access to a tangible, Wacker and colleagues (1990) taught participants to mand the sign *please*. In two studies, research teams taught students to use icons to serve as the mand (Martin, Drasgow, Halle, & Brucker, 2005; Wacker et al., 2005). For example, Martin et al. taught their participant to present an icon card with the words *No Thank You* written upon it to replace tantrums, which served as an escape function. Wacker et al. (2005) used an augmentative device to teach a participant to press a micro switch that said, *Please*. This response replaced self-injurious behavior, which was attention maintained.

Across all studies, communication responses were taught in a similar fashion. For example, when Durand and Carr (1992) taught participants to verbally mand, *Am I doing good work?* the training continued until the children were able to perform the task correctly 10 consecutive times. Similarly, in the study conducted by Martin and colleagues (2005), participants were trained to emit the communicative response without error. In summary, all participants were taught one mand until they were able to respond correctly 10 consecutive times.

*FCT designs and procedures.* After the communicative responses were taught, research-

ers used one of the following research designs for FCT: multiple baseline or reversal. As shown in Table 3, researchers used a reversal design in four studies. For example, Carr and Durand (1985) alternated relevant and irrelevant response phases with baseline. First, baseline data were collected in which no intervention was implemented. Then, participants were reinforced for relevant communicative responses by the trainer giving them assistance. After this phase, reinforcement was removed, thus, returning to baseline. Next, participants were reinforced for irrelevant responses; these responses however had nothing to do with the task at hand or the behavior's function. The sequence was then repeated; however, the phases (i.e., relevant and irrelevant) were counterbalanced. Also as shown in Table 3, four studies used multiple baseline design. For example, Durand and Carr (1992) implemented the procedures with one participant as they continued to collect baseline data on the remaining participants. After a few sessions, they implemented the procedures with the next participant as they continued to implement the procedure with the first participant. This continued until the procedure was implemented with every participant.

#### *Major Findings*

Regardless of the research design, research teams reported similar findings, in that they were all successful regardless of the topography of the behavior (i.e., aggression, tantrums, self-injurious behavior), the behavior's function, or the mode of communication. As shown in table 4, this success was demonstrated by a decrease of challenging behaviors with a corresponding increase in communication, but the communication mands were limited in scope. For example, in a study by Carr and Durand (1985), a participant's challenging behaviors decreased and his use of one mand increased.

*Behavioral results.* After implementation of FCT, research teams found a decrease in challenging behavior across all studies. For example, Wacker and colleagues (2005) found that FCT combined with time-out resulted in hand biting decreasing to zero percent. Similarly,

Carr and Durand (1985) found challenging behaviors to decrease to 0.5% upon the successful implementation of FCT. Also, Wacker and colleagues found significant decreases in challenging behavior for all but one participant, whose behavior's function was undifferentiated, consequently, researchers noted that the communication response must match the challenging behavior's function.

*Communication results.* Akin to the positive behavioral results across studies, participants increased their use of communication mands, but they were limited in range. Carr and Durand (1985) noted sustained rates of relevant responses in the final phases of the study, but only one response was taught and measured. In a later study, Durand and Carr (1992) also found an increase in unprompted communication, the communication however was again limited to one type of mand. More recently, the participant in Martin et al.'s (2005) study independently used his icon card to request an item 100% of the time following training in phase; similar to previous studies, they focused on one mand with no expansion of communication.

#### *Reported Reliability and Treatment Fidelity*

Reported research results would be compromised unless the procedures were implemented with fidelity and observations were reliable. Fortunately, all research teams reported high treatment fidelity (i.e., consistency of implementation of the methods and procedures of treatment) within their prospective studies. They also reported high inter-rater reliability (i.e., agreement of observed phenomenon). For example, Carr and Durand (1985) reported reliability of 80% or greater for all categories. Similarly, Wacker et al. (1990) had an average reliability of 92%, with 80% or more for each category. Martin and colleagues (2005) reported greater reliability ranging from 97% to 99%.

#### **Discussion**

A significant impairment in communication is one of the defining characteristics of autism, subsequently causing problems with behavior. FCT is one approach researchers employed to address the communication and behavioral

needs of children with autism. As researchers developed FCT, they provided interventions in clinical settings removed from natural environments (e.g., children's classrooms, homes), which is typical for the initial stages of procedural development. When implementing the procedures during initial development stages, research teams produced positive behavioral and communication results. For example, Durand and Carr (1987) indicated an increase in communication and a decrease in challenging behaviors, but this study occurred within a separate 5 x 10 meter classroom that excluded the child's teacher and focused on one communication mand. Thus, readers may acknowledge that FCT works when researchers conduct training in small isolated rooms and focus on one communication mand.

Similarly, other research teams indicated an increase in communication and a decrease in challenging behaviors (e.g., Carr & Durand, 1985; Durand & Carr, 1987; 1992). Based on the evidence provided in this review with the progression of knowledge and time, researchers for the other studies continue to conduct FCT similar to the first published article in 1985. They typically conducted the training themselves and did not extend the research beyond clinical settings that focus on one communication mand. Each limitation poses a critical threat to maintenance and generalization of the communication and behavioral results, consequently decreasing the effectiveness of the FCT.

#### *Maintenance*

Although children achieve more independence when they maintain skills across time (Schuler, 1995), most researchers did not address this area. Durand and Carr (1992) checked for maintenance with naïve trainers, but not with the children's' teachers or parents, which would also address generalization. Based on the evidence provided in this review, no research team conducted long term follow up studies to identify children who maintained low levels of challenging behaviors and high levels of communication. Further, research teams did not plan for maintenance across time. For example, Wacker et al. (1990) analyzed across topographies of behavior, but

did not plan for skill maintenance. Without following the participants and periodically checking for the use of taught skills, researchers may not know if the interventions aid children with autism in developing independence.

### *Generalization*

Similar to the benefits of skill maintenance, children achieve greater independence when they generalize skills across settings and people (Layton & Watson, 1995). Generalization is particularly difficult for children with autism because they often remember tasks specific to the situation (Siegel, 1996). For example, Grandin (1995) described her experience as a young child and her insistence on routine. When a therapist taught her a task, she assumed the task applied to sessions with her therapist, thus, Grandin continued to engage in challenging behaviors in other settings. Additionally, children with autism frequently develop communication that only one other person recognizes (Schuler, 1995). A mother of a child with autism for example described a scenario where her child depended on her for a glass of water because she interpreted his grunting as a request (Maurice, 1993). When the child attended school, he screamed and hit himself when other individuals did not know he was thirsty. If researchers planned for generalization, children with autism likely would not exhibit such outbursts. Most researchers however continue conducting research without considering generalization. For example, only two of the eight research teams extended the research beyond the typical research environment. Further, only one of these studies occurred in a natural environment, that is, in a setting with people the child typically encounters.

### *Implications for Researchers and Practitioners*

Since one of the goals of education is to improve the quality of life for the child and parents, FCT should occur in natural environments. Training in the natural environment teaches the child to associate the components of FCT with teachers, parents, classrooms, and home (i.e., generalization). Further, natural environments pose sensory issues (e.g., back-

ground noises, various lighting, other visual stimuli) for children with autism to overcome that is not present in stagnant environments. Therefore, future research should be directed at training teachers in the classroom and parents in the home.

### *Training Teachers*

Training classroom teachers allows the child to associate FCT with the teacher and classroom. For example, if research teams teach a child in his or her classroom to ask for help completing a puzzle, the child will know to mand the request when performing the task at later times in the same room. For the process to be more beneficial, the teams should have the child's teacher train him or her to mand the request. Therefore, the child will communicate with the teacher rather than rely on researchers who leave after the completion of the study.

After the research teams leave, teachers should continue to teach communication skills. Two ways teachers may enhance communicative behavior include: (a) taking advantage of naturally occurring opportunities and (b) arranging the environment to be conducive to communication.

*Natural opportunities.* During the school day, opportunities to teach communication skills abound. One period of particular interest is lunchtime because of the numerous communicative interactions naturally within the lunch routine. For example, as students progress through the lunch line, they choose a drink. Teachers may use this chance to teach students with autism to mand a request for milk or water. Similarly, teachers may use routines in the classroom to teach mands. For example, during coloring activities, the students may mand for markers or other desired tangibles.

*Arrange environment.* In addition to teaching mands during natural routines, teachers may arrange the classroom environment to encourage communication. For example, a teacher placing desired objects on shelves in view of, but out of reach of the children with autism creates a situation where a child desires to mand a request for an object. Further, teachers may include interests of children with autism in classroom activities and subse-

quently teach the children to mand for the interests, thus enhancing communication.

### *Training Parents*

Besides training teachers, research teams also should focus on training parents to use FCT. Training parents in their home accomplishes two goals. First, the child will associate communication with the home environment. If a child needs help obtaining an item on a shelf in his or her bedroom, the parents train the child to request help in that setting. For greatest benefit, parents should train their child in each room of the home, allowing for generalization to all home settings. Second, the parents will begin to reinforce communication that others understand. For example, rather than giving the child water when he or she grunts, the parents who use FCT give the water to the child after he or she responds with the trained communication mand.

Parents may enhance communication in the home by using approaches similar to those teachers use in schools. That is, communication of children with autism may be enhanced in two ways: (a) by taking advantage of the natural environment, and (b) by arranging the environment to be conducive to communication.

*Natural environment.* The home includes several naturally occurring routines for increasing communication skills in children with autism. Mealtime is an excellent period to enhance communication. For example, children with autism may be taught to request certain food and more portions of the food. The key for the latter part is to give the children small portions, thus, increasing the opportunities for requesting.

*Arrange environment.* Parents may also arrange the home environment to increase opportunities to request. For example, when parents place their child's favorite items out of reach, the child must request for the item. Further, parents may play on the floor with their child's preferred toys, thus, creating another opportunity for their child to communicate.

### *Conclusion*

The high prevalence and incidence of autism combined with problems in communication

and behavior demands a response from the field of special education. Spanning the past twenty years, research teams responded with FCT. Most research on FCT however does not include children with autism. Further, the majority of research remains the same as Carr and Durand's (1985) first published article regarding FCT, that is, clinically based. Future research teams should address maintenance and generalization by training teachers in classrooms and parents in homes while collecting data across time.

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