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Andy Bondy and Lori Frost
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The Picture Exchange Communication System (PECS) is an alternative/augmentative communication system that was developed to teach functional communication to children with limited speech. The approach is unique in that it teaches children to initiate communicative interactions within a social framework. This article describes the advantages to implementing PECS over traditional approaches. The PECS training protocol is described wherein children are taught to exchange a single picture for a desired item and eventually to construct picture-based sentences and use a variety of attributes in their requests. The relationship of PECS's implementation to the development of speech in previously nonvocal students is reviewed.

The Picture Exchange Communication System

ANDY BONDY

LORI FROST

Pyramid Educational Consultants

Communication is a complex behavior (see Skinner, 1957). For an act to be defined as communicative (or “verbal,” within Skinner’s analysis), it must be under the stimulus control of the listener, and the subsequent reinforcement must be mediated by the listener. In more lay terms, we have defined functional communication as “behavior (defined in form by the community) directed to another person who in turn provides related direct or social rewards” (Bondy & Sulzer-Azaroff, 2001).

Historically, therapists working with children with autism spectrum disorder (ASD) have used a broad array of training protocols to teach communication skills. When speech production is viewed as the goal of intervention, speech imitation protocols are used. The basic premise of these approaches is that children can be taught to speak by imitating the various sound and word productions of the therapist. If, however, a program is to rely on a child imitating the therapist, then what must first be taught are basic attending skills such as sitting appropriately and looking at the therapist (e.g., Anderson, Taras, &

Cannon, 1996; Lovaas, 1987). When speech imitation is initially difficult for children, the task may be simplified by teaching the child to first imitate specific nonspeech actions of the therapist. Some children spend many months in this type of training before the first words are spoken, and a fair proportion of children fail to develop speech within a reasonable period of time (i.e., 3 to 6 months). Furthermore, some approaches to vocal imitation may result in skill acquisition but yet fail to generalize to spontaneous communication. That is, modeling by the therapist may lead to prompt dependency by the learner.

Therapists recognizing the limitations of speech imitation training programs or looking for alternative communication modalities to teach while speech is developing have tried various alternative or augmentative communication systems. These have included both sign language and picture- or symbol-based communication systems that require a user to point to or touch pictures or symbols in order to encode a specific message. If the goal of intervention is the use of communication in a variety of natural settings, then sign language presents limitations merely because of the limited number of communicative partners available to the user. Although there is a distinct signing culture within the deaf community, we are aware of no reports of a child with autism successfully participating as a full member of this group. Furthermore, traditional approaches to sign training have focused on a child's imitation skills with concomitant concerns over developing prompt dependency, poor generalization, limited total vocabulary, or limited complexity. Recent efforts by some have led to training programs that minimize modeling while promoting greater use of direct physical prompts (Sundberg & Partington, 1998).

Many children using picture-point systems are inaccurate pointers or have difficulty isolating a single finger to point, related either to age or specific motor difficulties. A child may touch the communication board with his or her whole hand, covering many pictures. This lack of precision in pointing requires that the listener interpret these imprecise messages. Picture-point systems often limit the user to communicating only in situations where a "listener" is near enough to see the pictures or the action of the user. Therefore, many children wait for a teacher to approach them (usually with a question such as "What do you want?" or "What is it?") before using the communication display.

The use of such prompts also may result in prompt dependency, again limiting generalization to spontaneous use. Furthermore, keeping our definition of communication in mind, teaching someone to point to pictures (or other visual symbols) does not necessarily bring them in direct contact with their communicative partners (even if the device involves a voice-output component). In fact, we have observed many children with autism sit and point to pictures without ever approaching the potential communicative partner.

In addition, many traditional programs fail to consider the importance, from the child's perspective, of the potential outcomes of engaging in a communicative exchange. For example, typically developing children's first words are as likely to be associated with concrete outcomes ("Airplane!" to get mom to hand the child his favorite toy airplane) as with more social outcomes ("Airplane!" to receive some social reaction from mom such as "Yes, I hear one, too") (Wetherby, Cain, Yonclas, & Walker, 1988). These two communicative functions are identified as *mands* and *tacts* by Skinner (1957). Many traditional programs begin by teaching children to name or label objects or pictures with the assumption that once the child knows the word he or she will be able to use it in all contexts. Because children with autism are much more likely to engage in behaviors that lead to tangible outcomes (Mundy, Sigman, & Kasari, 1990), they often fail at traditional labeling lessons.

The Picture Exchange Communication System (PECS) is a training system that was developed to teach children with ASD a rapidly acquired, self-initiated functional communication system (Bondy & Frost, 1994, 1998). Because tangible outcomes initially are more motivating to children with autism than are social outcomes, PECS begins by teaching requesting. The overall protocol is divided into six phases that progress from teaching children how to communicate using the pictures in a manner that is important to the child, to the use of multipicture sentences, and then to the use of a variety of communicative functions. The protocol combines the theory and practices of both behavioral and developmental, or interactional, perspectives. Typical language development initially is paralleled so that children functioning as young as 10 to 12 months can learn the initial phases (Scott Helsing, personal communication, 2000). PECS relies on the

principles of applied behavior analysis so that distinct prompting, reinforcement, and error correction strategies are specified at each training phase in order to teach spontaneous, functional communication. Specifically, no verbal prompts are used (although responding to natural verbal cues is taught later in the sequence). When teaching communicative initiation, two trainers are used: one who acts as the communicative partner (the listener) to interact socially with the child and one who provides physical prompting from behind the child and who will not interact with the child in any social manner. This type of prompting strategy reduces the likelihood of developing prompt dependency on cues provided by the communicative partner and can be faded easily so that spontaneity is achieved very early in training.

TRAINING SEQUENCE

REINFORCER INVENTORY

PECS begins by teaching spontaneous requests. In order to do so, though, the trainer first must know what the child wants. The initial step in implementing PECS, therefore, is to determine which items the child persistently wants. This entire process can be conducted without any verbal prompts such as "Show me what you want," "What do you want?" or "Do you want this?" Rather, the trainer merely offers items and then observes the student's subsequent actions. Specific, observable actions such as reaching toward, looking toward, taking, and so on indicate that an item is preferred. Once the trainer has identified a variety of items the child seems to like, he or she systematically offers a few items at a time in order to determine a hierarchy of preferences.

Phase 1: How to Communicate

Typically developing children learn the nature of communication as early as 6 to 9 months of age when they begin to develop interactive routines with mom or dad. These interactions may or may not involve babbling, but they certainly precede the development of spoken words. Instead, they involve an *approach* (or orienting response) via

looking at their parents, physically getting closer, pointing to them, or some similar action; a *behavior* that draws attention to some event or item (such as the movement of an object, a sudden noise, etc.); and a *consequence* by which the parents reinforce the behavior via laughing, smiling, repeating the vocalizations or gestures, or providing a tangible outcome. Thus, even though no words are spoken, a communicative episode can be identified. In Phase 1 of PECS, students are taught to similarly communicate without using spoken words—they learn to approach another person (reach toward), engage in a specific behavior (give a picture), and receive a desired outcome (the item asked for).

Just as typical children do not use actual words during this early learning period, students using PECS also do not yet choose a specific picture. Instead, they use the single picture prepared by the teacher. A child does not need to have mastered discrimination between symbols or pictures before learning the basic elements of communication (just as typical children do not demonstrate the use of spoken words prior to learning to communicate). As with typically developing children, learning to use a specific word or symbol comes later.

Phase 1 is designed to teach a physical behavior that will be considered communicative. The student learns to pick up a picture of a desired item, reach to a communicative partner, and release the picture into the communicative partner's open hand. Spontaneity is ensured by using two trainers: one who acts as the physical prompter and one who provides prompts from outside the communicative interaction.

The initial training episode begins with the communicative partner showing the child what is available or enticing the child with that item. Teaching the child to initiate a communicative exchange takes advantage of the child's tendency to reach for rewarding items. Note that the initial reach for the item is not a communicative act—it is controlled by the properties of the item itself, and thus there is as yet no listener for the child. On seeing this reach, the physical prompter provides physical assistance to pick up the picture, reach to the communicative partner, and release the picture into the communicative partner's hand. The communicative partner reacts by immediately giving the item to the child while naming the item ("Ball!"). The child is allowed to play with the item for several seconds or consume a small portion, if edible.

Training continues in this manner: The communicative partner silently entices the child with the desired item, and the physical prompter waits for the child to reach before providing physical assistance to pick up the picture, reach to the communicative partner, and release the picture into the communicative partner's hand. Over several trials, the physical prompter gradually fades assistance so that the child learns independently to exchange the pictures to gain access to the desired item. The communicative partner should take care to not prompt the child by holding out a hand before the child has picked up the picture. Once the student is reliably picking up the picture and reaching toward the communicative partner's open hand, the partner fades this open-hand cue by waiting increasingly longer to show a hand once the student is reaching with the picture.

This initial training often takes as few as 10 or 15 minutes before the child learns to independently exchange the picture. This arrangement is repeated across the day using a variety of reinforcers and a variety of trainers so that generalization across materials and trainers is taught from the beginning. The outcome of Phase 1 is that the child, upon seeing a desired item, can pick up a picture, reach toward the communicative partner, and release the picture into the communicative partner's hand to obtain the desired item.

Phase 2: Distance and Persistence

A critical component of spontaneous communication is persistence when no reaction is given to an initial attempt. During Phase 2, children are taught to persist in their communicative attempts despite a variety of obstacles or when lesson parameters change slightly. Generalization is taught by systematically eliminating both overt and subtle prompts that might be cueing the child to initiate communication. Typically developing children use volume or loudness of their voices when initial communicative attempts are not acknowledged.¹ Children using PECS may not have these vocal components, so they must be taught to persevere via other strategies. The child will learn to reach farther to get to the hand of the communicative partner or to actually travel to the partner by walking increasingly greater distances. The child will learn how to be consistent at delivering the pic-

ture even when the communicative partner is not looking at the child or has his or her back turned to the child. Children become so persistent, we often say that they are nagging us!

During Phase 2, the children also will learn that the pictures with which they are communicating do not always magically appear in front of them when they need them. If this were the case, the children would not be truly spontaneous communicators because the pictures would serve as a cue or prompt to communicate. Therefore, the students are taught to get their pictures when they need to communicate, including when they do not see a picture immediately before them. Another goal is for a child to be able to continue approaching (and even finding) his or her audience when that person is not immediately nearby or even is in another room.

During subsequent lessons, the trainers teach the child to go get the picture when he or she needs to communicate. A communication binder is created, and the one picture that is in use is placed on the front cover of the book. Additional pictures of desired items are stored inside the binder. Also in Phase 2, additional prompts that are identified as unique to a student's particular learning environment are eliminated. Many trainers appropriately use an expectant look when waiting for students to initiate. Some trainers use slight gestural cues or eye gaze to direct a student to initiate. All of these cues should be identified and eliminated so that the child learns to be spontaneous within all situations. To further enhance spontaneity, training continues to take place with a variety of trainers, across all daily activities, in a variety of contexts, and with a variety of reinforcing items.

Phase 3: Discrimination Between Symbols

Once students have become persistent communicators who reliably approach different people in order to request a variety of favored items, the next step is to teach discrimination between symbols so that messages become specific. Many traditional picture-based communication programs begin picture discrimination by teaching the child to "match to sample." This type of lesson progresses from having the student match objects to objects, then objects to pictures, pictures to objects, and so on. For many of our students, this lesson is minimally

motivating, so we must encourage the student to participate in it by offering reinforcers that are usually arbitrary to the situation. These lessons also may not be communicative because the action taught is directed to objects and pictures, not another person. Therefore, even when mastered, visual matching skills do not necessarily generalize to communicative use of the pictures. The PECS training protocol arranges for "picture learning" lessons to occur within the communicative context and does not depend on previously established matching skills.

Discrimination training begins by presenting the child with a choice of two pictures and then demonstrating that choosing and exchanging a particular picture results in specific consequences. A common error is to begin discrimination training with two or more items that are equally rewarding to the child. In such cases, when the child selects one picture, we cannot be certain which item he or she truly desires. If both items are equally rewarding, then giving either picture results in equally desired outcomes. Therefore, at the beginning of Phase 3, the difference between these consequences is exaggerated by using a highly desired item and a nondesired item with corresponding pictures placed on the front of the communication book. If the child exchanges the picture of the desired item, the trainer gives the child that item along with some animated social praise. If the child gives the teacher the distracter picture, he or she is given that item. When the child reacts negatively to receiving this item, then an error correction sequence is used that involves (a) demonstrating (via tapping or other visual cues) making the correct selection, (b) prompting the selection of that picture but only providing praise rather than the item for that prompted response, (c) switching to a known skill, and (d) repeating the choice with the provision of the item upon selection of the correct picture. Furthermore, to assure the shortest possible time between the new skill (select the correct picture) and reinforcement, the teacher provides some type of conditioned reinforcer (i.e., tone of voice, thumbs-up sign, etc.) the instant that the correct picture is touched (and thus prior to putting the picture in the hand of the communicative partner).

When this type of discrimination training is effective, the trainer then arranges for the two pictures on the front of the book to gradually

become more equal in desirability. When pictures of two desired items are on the front of a communication book, a potential dilemma occurs. It is possible that the student could exchange one picture while wanting the other item. Because both items are preferred, though, the child would not be upset at receiving the item matching the picture he or she exchanged. For example, during free play, the teacher might place a picture of blocks and toy cars on the front of the book because these are two favorite play activities for the child. The child could want the blocks but exchange the toy cars picture. When the teacher gives the child the toy cars, though, the child is content to play with the cars.

To determine what the child really wants, the trainer conducts a correspondence check to assess whether the child's actions correspond to his or her requests. In this manner, we can test whether there is true correspondence between the selected picture and the selected item. When the child gives the teacher a picture of toy cars, the teacher presents both the toy cars and the blocks to the child and says, "Take it." If the child reaches for the cars, having asked for them, he or she is allowed to take them and play. If the child reaches for the blocks after exchanging the toy cars picture, the teacher blocks access to the blocks and proceeds with an error correction sequence similar to that noted earlier. An important aspect of these correspondence checks is the teacher saying, "Take it" rather than "Take cars." The neutral statement helps assure that the child is making a visual discrimination rather than an auditory discrimination.

Discrimination training continues by increasing the number of pictures on the front of the book and increasing the number of items from which the child must choose when correspondence checks are used. Once children can discriminate between up to five or six pictures on the front of the book (in an X-like pattern), they also learn to look inside the book and perhaps through several pages to find desired pictures.

Phase 4: Using Phrases

So far in PECS, students have learned to request a variety of desired items from a variety of communicative partners across various settings. The communication skill still to be addressed is *commenting*.

When typically developing children begin learning language, they generally acquire comments at the same time they acquire requests because each type of reinforcer—social and direct—is highly motivating. The two functions codevelop and are used with roughly equal frequency. Typically developing children who use only single words (i.e., not yet combining words into short phrases) let the listener know whether they are commenting versus requesting by their use of intonation and gestures. The requesting word is accompanied by a demanding tone of voice and reaching toward the desired object. The commenting word is accompanied by an exclamatory tone of voice and pointing. Because they are nonspeaking, children who use PECS are not able to provide the listener with tone-of-voice cues. Because of their social deficits, many of these children do not develop common reaching and pointing gestures. Consequently, in preparation for teaching commenting, we must anticipate that our children will need to learn alternative methods of letting their listeners know if their pictures are being exchanged to request something or to comment on something.

Children using PECS are taught to mark this new function with various sentence starters. For example, “I want” would mark a request, whereas “I see” or “it is” or “I hear” would mark comments. Because requesting (and its related consequences) continues to be a more motivating communication skill to engage in, Phase 4 begins by teaching children to use a sentence starter within a request.

The social approach necessary for communication is maintained by teaching the child to construct a two-picture sentence (“I want” and “cookie”) that is exchanged. A sentence strip is attached to the communication book, and the child learns to build and exchange the phrase by attaching the “I want” picture to the strip, attaching the desired item picture to the strip, removing the strip, and exchanging the strip. The communicative partner reacts by turning the strip back to the student and reading it back to him or her while delivering the requested item. This new sequence of skills typically is acquired rapidly (Weatherup, Forgeron, Canesi, & Thibadeau, 1996) when taught via backward chaining (see Sulzer-Azaroff & Mayer, 1991).

Phase 5: Answering a Direct Question

Phase 5 continues to build on current skills in anticipation of teaching new functions. Children with ASD who are at this stage in PECS generally remain relatively insensitive to social consequences such as those that follow commenting. Therefore, teaching spontaneous commenting is often difficult. Bondy, Ryan, and Hayes (1991) found it more effective to teach commenting initially in response to a simple question (i.e., "What do you see?"). To further ready children to answer a question about commenting, training first focuses on teaching children to answer a question related to requesting. The outcome associated with this act continues to be access to a desired item. Thus, in Phase 5, children learn to answer the question, "What do you want?"

This lesson is taught using a delayed prompting procedure (Halle, Marshall, & Spradlin, 1979) in which the question is paired with presentation of a helping prompt that will ensure success. Initially, the question and prompt are presented simultaneously, but over time, a delay is inserted between asking the question, "What do you want?" and providing the additional gestural prompt toward the "I want" icon. The goal is for the student to begin answering the question before the trainer uses the helping prompt. Because constructing a sentence is a familiar response for the student and because the outcome of answering the question is motivating for the child, Phase 5 typically is acquired rapidly. It also is important to ensure that although teachers and parents may now ask the question, "What do you want?" children should be able to maintain their spontaneous requesting skills.

Phase 6: Commenting

When students reach this point in training, they can communicate with a variety of people in order to make frequent spontaneous requests using the phrase sentence starter, "I want." They can answer the question, "What do you want?" Their vocabulary consists of a variety of pictures representative of preferred items and activities. When beginning Phase 6, the trainer relies on the student's mastery of all of these skills. The trainer adds a picture representing a phrase such as "I see" to the student's communication board and begins training by

arranging interesting and/or surprising items to appear. The teacher then uses the delayed prompting procedure to ask, "What do you see?" while pointing to the "I see" picture. Because students are familiar with this prompting procedure and with constructing a picture sentence when the trainer points to the sentence starter, they are likely to put together the sentence, "I see . . ." The trainer's response at this point in training is crucial. He or she must respond with only social feedback ("Yes, I see a fire truck, too!") rather than providing access to the item. It is this differential outcome that teaches students the distinction, in addition to form, between commenting and requesting. Presenting an interesting but minimally preferred item will reduce the likelihood that the child will react negatively when the item is not provided (as it has been up to this point).

Another critical step in Phase 6 training is teaching the child to differentially answer "What do you see?" and "What do you want?" by appropriately using the "I see" or the "I want" icon. During this training, multiple opportunities for spontaneous requesting must be created so that the student maintains this skill.

To develop spontaneous commenting, training should, first of all, replicate situations during which typically developing children comment. Situations during which surprises or violations in expectations occur elicit spontaneous comments from typically developing children. Frequent opportunities for this skill can be created in structured lessons and via incidental occasions throughout the day.² Across several consecutive opportunities, the trainer gradually can fade the question, "What do you see?" so that the environmental event itself comes to elicit the comment. Other types of commenting questions and their corresponding icons can be introduced, including "What is it?" "What do you hear?" "What do you have?" and similar questions.

ADDITIONAL VOCABULARY TRAINING

Once children have mastered Phase 4, and while learning Phases 5 and 6, additional vocabulary can be introduced beyond those associated with preferred items and activities. Many teachers have found that students often have difficulty learning language concepts such as colors, sizes, shapes, quantity, and location. It is often assumed that

these concepts must be learned in a receptive format (i.e., “Touch big,” “Give me blue.”) before the student will be able to use them expressively. The early tendency to insist on these lessons may be related to the need to work on communication in some fashion while children are learning to imitate actions and vocalizations. For children who have learned to request via PECS, other communication lessons are available that do not depend on receptive skills. The rapid acquisition of requesting within PECS offers a unique avenue for teaching these concepts (Frost & Bondy, 1994). For example, if a child prefers a white doughnut to a brown doughnut, he or she could be taught to request that doughnut using the picture sentence “I want white doughnut.” The advantage of teaching attributes and other concepts within a requesting function acquired via PECS is the use of a more naturally reinforcing, child-selected contingency. When a variety of items is identified for which the child has a particular color preference, and the child learns to request specific colors, then mastery of color concepts is assessed by conducting further correspondence checks. When the child asks for a red Skittle, the teacher holds out red, green, and blue Skittles and says, “Take it.” If the child consistently takes the correct Skittle, then he or she is learning colors.

A variety of attributes can be taught following this requesting format. Shapes might be important to a child if he or she prefers one particular shape of a cookie to another. For example, Lorna Doone cookies are square, Vienna Fingers are oval, and Oreos are round. Location can be made important when a child must ask for a favorite toy car that is on the top shelf as opposed to a nonpreferred toy car that is on the bottom shelf. Size is usually extremely important if it is related to serving quantity! Most children would prefer a big pretzel to a small pretzel. Of course, the teacher must find opportunities for when little is important from the child’s perspective (as in obtaining a little spoon when a regular spoon and cafeteria serving spoon are offered). If a child likes to draw and all of the long pencils have broken leads, then short pencils with their intact tips would become important. It should be noted that although receptive use or understanding of a picture is not a prerequisite for use of that picture within a PECS request, use of the picture within requests does not guarantee appropriate receptive understanding of the picture. Each skill (receptive and expressive use

of symbols) initially is independently acquired, thus necessitating two distinct lessons.

When children use attributes such as color or size, are they merely responding to matching to sample as opposed to responding to more generalized cues? That is, the red color used in the icon for red has some degree of dimensional overlap with the red color of the item referred to. Does this dimensional overlap account for all use of attributes within PECS? Although no direct study on this question has been conducted, consider situations in which a child requests or comments about something heard, as in "I hear the bell" or "I want loud music." In such cases, there is no possible dimensional overlap between the icon representing bell or loud and the referent (i.e., the sound of the bell or the volume of the music). Thus, although such stimulus overlapping may be present in some circumstances, there is no evidence that it is the only causal variable in the use of the visual icons.

In addition to incorporating attributes into requests, additional vocabulary related to items associated with reinforcers can be taught. If a child asks for juice and is handed a full half-gallon pitcher, then he or she will be motivated to learn to ask for a cup. If a child enjoys listening to cassette tapes but the tape player is missing, then he or she would need to learn to ask for "tape player."

Within functional routines such as preparing a snack, setting the table, or brushing teeth, additional vocabulary can be taught using a variety of sabotage strategies or an interrupted behavior chain format (Halle et al., 1979). Before these lessons can be developed, though, it is necessary to assess whether or not these routines are fun or motivating for the child. If a child likes organizing dishes and matching a cup, plate, fork, and so on to the place mat template, then he or she will be motivated to ask for a missing cup. On the other hand, if a child hates brushing his or her teeth, the child may not be motivated to ask for missing toothpaste. But, if a nonfavorite routine is always followed by a favorite activity, then finishing the routine will be motivating. In this case, the child can be taught to ask for the missing toothpaste. In addition to the routine being reinforcing, it is important for the child to have mastered the routine. A child who does not know that toothpaste goes on the toothbrush will not know to ask for it regardless of whether the child is motivated to brush his or her teeth.

**THE RELATIONSHIP OF PECS TO
OTHER COMMUNICATION LESSONS**

Requesting desired and needed items is perhaps the most crucial communication skill for students to learn if they are to function independently. In addition to requesting, however, several other skills are important and should be taught along with PECS. For example, the ability to answer yes-no questions is commonly assessed by standardized language tests. These assessment tools typically do not differentiate between the two types of yes-no questions, so answering "Do you want this?" and answering "Is this a . . . ?" are considered equivalent skills. However, the teacher's response to appropriate answers to the former question involve providing or removing the item, whereas the response to the latter question is purely social (i.e., "That's right, it is a pencil!"). If a child is motivated to gain access to a favorite toy or avoid a nonpreferred activity but is not particularly motivated by hearing "Good job!" then he or she is more likely to learn to respond to the question, "Do you want your GameBoy?" than "Is this a cup?" Once children have mastered Phase 1 of PECS, they should be taught to answer, "Do you want this?" Rather than use an abstract or arbitrary symbol, a head shake or nod is recommended. Two trainers are used as when teaching initiation within Phases 1 and 2 of PECS: one to interact with the child and the other to provide physical prompting to help the student nod or shake his head.

Another critical communication skill is requesting assistance. When encountering an obstacle, children with autism frequently engage in inappropriate behavior rather than approach an adult for help. Therefore, the first step in teaching a student to request help may be to teach him or her to approach an adult. As this act is one of initiation, two trainers are required. The communicative partner approaches the student and hands him or her a favorite item with which there is a problem. As soon as the child discovers the problem (and before he or she engages in inappropriate behavior), the second trainer physically prompts the child to hand the toy to the communicative partner. The communicative partner says, "Oh you need help with this!" provides the assistance, and gives the item back to the child. Once the student independently brings items to an adult for assistance, then he or she can be taught to request assistance either gesturally or with a symbol.

Again, the physical prompter initially manually helps the child to manipulate the symbol or gesture for help. A symbol for help also will be necessary in situations in which the child cannot bring the item to the adult (i.e., a door that will not open, a television that will not turn on, etc.).

All of us experience situations from which we wish to momentarily escape. Therefore, another critical communication skill is asking for a break. This response should mean something other than "I quit" or "No!" Communicating "no" indicates that the child does not want to participate in an activity at all. "I need a break," however, indicates that the child needs to leave an activity for a moment but will return to that same activity. Children sometimes engage in inappropriate behaviors in order to escape (Carr, Newsom, & Binkoff, 1980). In such cases, a child can be taught to exchange a symbol for "I need a break" and then be allowed to leave the group for a moment. Such breaks would involve various rules concerning how long the break should last and what the child can do during the break. At the signaled end of the brief break, the child should be reminded about what reinforcement is available for returning to the group.

Just as many children with ASD benefit from learning to communicate with pictures, they can benefit from picture-based communication that is directed at them. A common complaint from those teaching or living with children with ASD is that the children have difficulty with transitions. This difficulty is assumed to be due to children's not understanding what they are expected to do next. It may be more pertinent that a child does not know if an effective reinforcer is associated with the next activity. That is, when a child playing in a classroom is told to line up and go to gym, a negative reaction may be due to the immediate loss of the item being played with, as opposed to not understanding where to go. An effective method for signaling to the child both what activity and what reinforcers are next is to use visual cues. For example, at transition times, the teacher approaches the child and shows a picture of a preferred item (or the item itself) and then shows a picture representing the next activity while saying, "Go here." The trainer physically guides the child to the designated activity. As the child learns to respond to a variety of these picture-based directions, the pictures then could be arranged in a schedule that the child uses to

independently transition throughout the day (MacDuff, Krantz, & McClannahan, 1993).

One final critical skill involves responding to the direction, "Wait." Children who are told to wait often are unsure of when or if the desired item (or activity) will be available. Essentially, children may interpret "wait" as equivalent to "not now, not ever!" Children who use PECS to request an item are signaled to wait by being handed a picture or symbol representing "wait." The initial wait intervals are kept very short (3-5 seconds) to ensure success. Furthermore, this lesson is only arranged when the teacher has complete control over the item requested. Over time, the period of waiting is gradually lengthened. As the wait period is stretched, the "wait" symbol comes to serve as a promissory note—children learn that as long as they are holding it, they eventually are going to receive the desired item or activity. Children also are taught what they can do while waiting (rather than merely being told to stay out of trouble).

PECS AND THE CODEVELOPMENT OF SPEECH

PECS is introduced to children to help them acquire functional communication skills. Many parents and professionals are concerned that use of a picture-based system, especially with very young children, could be detrimental to the potential acquisition of speech. Research over the past 25 years (Carpenter & Charlop-Christy, 2000; Miranda & Erickson, 2000; Ronski & Sevcik, 1996) has shown not only that augmentative communication systems (aided or unaided) do not inhibit speech development but that use of these systems enhances the likelihood of the development or improvement of speech.

Follow-up observations of children age 5 years or younger who used PECS for more than 1 year showed that 59% developed independent speech (Bondy & Frost, 1994). They discontinued use of PECS and spoke as their sole mode of communication (although often with language delays). Another 30% spoke while using PECS. Schwartz, Garfinkle, and Bauer (1998) also found strong support for the use of PECS with preschoolers with various communication deficits and noted a positive correlation regarding the development of speech.

Marjorie H. Charlop-Christy from Claremont McKenna College and several of her graduate students at Claremont Graduate University presented a series of studies during recent conventions. In each study, they documented empirical evidence for the effective use of PECS by a variety of learners. They also presented data regarding the decrease in maladaptive behaviors following the introduction of PECS (Carpenter, Charlop-Christy, LeBlanc, & Kellet, 1998) as well as data supporting improved social behaviors (Le & Charlop-Christy, 1999; Le, Charlop-Christy, Carpenter, & Kellet, 1999). In addition, they offered evidence of improvements in speech development following the acquisition of PECS (Carpenter & Charlop-Christy, 2000; Carpenter, Charlop-Christy, LeBlanc, & Le, 1998). Another phenomenon observed with children using PECS while acquiring speech is that their speech output improves in number of words spoken and the complexity of their communication when given access to their PECS books (Frost, Daly, & Bondy, 1997).

CONCLUSION

PECS is a functional communication system for children with ASD and for children who are not using or developing speech in a functional manner. Successful implementation of PECS presents several distinct advantages. PECS teaches the social nature of communication initially; the first skill the children learn is to approach a communicative partner in order to request a desired item. Once this skill is learned, PECS use is expanded so that the children develop a broad vocabulary, sentence structure, and additional communicative functions. Through PECS, many children also learn to use conceptual vocabulary because the lessons are motivating from the child's perspective.

Research is currently focusing on systematic evidence associated with (a) PECS acquisition, (b) the impact of PECS on social approach, (c) the impact of PECS on behavior management, and (d) the relationship between PECS use and the codevelopment of speech. The continued success of PECS also will depend on the quality of training provided by those implementing the system. For many children, PECS

has proven to be their key to enhanced social and communicative growth.

NOTES

1. Skinner (1957) defines these types of behaviors as autoclitics.
2. This strategy also has been described as contriving an establishing operation (Michael, 1982).

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Andy Bondy, Ph.D., is president of Pyramid Educational Consultants. He has published and presented widely on issues related to designing effective educational environments for children and adults with autism and related disabilities.

Lori Frost, M.S., CCC/SLP, is cofounder of Pyramid Educational Consultants and codeveloper of the Picture Exchange Communication System. She has presented nationally and internationally on topics relating to communication training.