6 The Picture Exchange Communication System (PECS): Initial Training

When I first met Sophie, she was three years old and had just been diagnosed with autism. She had no speech or formal communication skills. She clearly liked snacks and juice as evidenced by her taking chips and sips of orange juice when these were left on a table. When I held a chip in my hand, Sophie looked at the chip and reached for it. If I gently closed my fingers around the chip, she would pry my fingers open to get to the chip. Whenever she took things that I held, she looked at the item and never at my eyes. If I held the chip tightly, she began to cry. When Sophie saw a chip or a cup on a bookshelf too high for her to reach, she cried and fell to the floor. She also liked to watch a particular cartoon video. If the video were turned off, she did not turn to her parents or other adults but walked to the TV and began to cry and slap her head.

Everyone was concerned that Sophie's tantrums were increasing in number and severity. When we assessed her, we found that she did not imitate simple actions or repeat simple sounds or words. We taught her to use PECS whenever we noticed there was something that she wanted. Within a couple of days, she would pick up a picture, reach across a tabletop, and put it in the open hand of the person who held the item she wanted. Within a week, when the TV was turned off, Sophie would pick up a picture of her favorite videotape and give it to her mother sitting next to her. Everyone noticed how much calmer she now appeared and how much more time she spent interacting with her parents. At this point, she still was not a good imitator nor had she used any spoken words, but she clearly had mastered the first step in functional communication—she had found her audience!

Many young children with autism (i.e., those under five years of age) do not use speech or other forms of formal communication when they enter educational or treatment programs. When a child does not speak, of course our hope is for that child to learn to speak as quickly as possible. However, as we reviewed in our earlier chapter on functional communication, a critical problem for these children is that they lack communication skills in any modality. Furthermore, we also know that young children with autism often are very poor imitators of actions and speech, when they are first diagnosed. An important question is: Are there ways to rapidly help a child learn to communicate that do not require speech or imitation? Fortunately, the answer is "yes."

In this chapter, we describe the use of the Picture Exchange Communication System (PECS) in some detail. We developed this system (Bondy & Frost, 1994; Frost & Bondy, 2002) over a period of time, primarily with young children with autism. We provide details on how to begin the system and how best to develop more complex communication skills. In the next chapter, we explain how we teach more advanced lessons with PECS, including the use of attributes and learning to comment. Many of the training strategies described can and should be incorporated into teaching the use of any AAC system. Furthermore, some of the strategies described are highly effective for children with autism who are acquiring speech.

The Development of PECS

Over twenty years ago, we were working on communication skills with a young boy with autism who was not successful at vocal imitation or pointing to pictures. We had tried teaching him to point to a picture among an array of pictures that corresponded to things he liked. However, we encountered a number of problems with this approach. First, in part due to his young age, he had difficulty reliably using just one finger to touch one picture. In addition, sometimes when he touched a picture, his eyes were focused on something happening outside. We weren't sure if he really wanted what he was pointing to, if he wanted what he was looking at outside the window, or if he simply liked the sound of his finger tapping on the picture board.

We were also concerned about our observation that some children with autism had been taught to point to pictures when they wanted

something but had not been taught to approach someone with the pictures to make sure that their message was "heard." That is, they could be sitting in the back of the room pointing to a picture on their board but unless someone happened to be looking at them, their pointing would be ineffective. They had learned to point to pictures, not to communicate—interact—with people.

Finally, we were concerned about the strategy traditionally used to teach children to point to pictures. That is, we had tried to teach children to match a picture with an object that we displayed. We would hold up an item, such as a ball, issue a simple instruction (using traditional though relatively odd phrases such as "match" or "find the same"), and teach the child to point to the corresponding picture. Many professionals advised that prior to teaching matching pictures to objects, we had to be sure that the child could match objects to objects. In each of these types of matching lessons, it was the teacher who started the interaction, not the child. Some children would only point to a picture when we began the sequence by holding up an item or using a spoken instruction. Therefore, these children were dependent upon prompts from adults to communicate and could not initiate an interaction.

Since the boy we were working with could not reliably imitate our actions, we had to devise a method to teach him to functionally communicate without imitating us. We thought this might be possible based on our knowledge that very young children typically learn to communicate independent of imitating others. That is, they learn to approach adults and engage in actions, which, though communicative, are not refined or formalized messages. (For example, an eighteen-month-old girl might look at her mother and simultaneously reach toward her ball that fell onto the floor.)

Given these concerns, we decided to teach this child to give us a single picture that corresponded to the item he currently desired. As with typical communication, giving us a picture required that he approach us. We started by making a line drawing of a pretzel, which was something we knew he enjoyed eating. With one of us enticing him with pretzels and the other one helping him with hand-over-hand guidance, we gradually taught him to give the single picture in exchange for the pretzel. Over time, we reduced the physical prompting and added pictures of other items and activities he desired to his "vocabulary." Eventually, we taught him to place several pictures in a row to construct a sentence.

We started using this same method to teach other young children with autism to communicate, and, in time, named our method the Picture Exchange Communication System (PECS). Our hope was that this method would accomplish several things:

1. The child would initiate the communication (rather than depend on a cue from the adult).
2. The child would find a communicative partner and approach that partner.
3. The child would use a single picture and avoid confusion that may accompany early discrimination between pictures.

We also hoped that this method of communication would avoid certain potential problems:

1. The child would not have to depend on prompts from the adult.
2. The child would not need to have learned to imitate actions or words prior to starting this lesson.
3. The child would not have to learn to make eye contact on demand prior to starting this lesson.
4. The child did not have to learn to quietly sit in a chair prior to starting this lesson.
5. The child would not have to master matching pictures to objects before quickly learning to communicate.

Of course, ultimately it is important for children to learn to imitate actions, sounds, and words, to sit attentively in a chair, and to look at someone on request. However, these are not prerequisites for a child to learn to functionally communicate her wants and desires. To functionally communicate, it is necessary for a child to approach someone and then deliver a message. And this is something that PECS most definitely enables many children (and adults) with autism to do.

What Are the Prerequisites for Starting PECS?

The primary factor to consider before beginning PECS is what your child does to indicate that something is reinforcing to her. That is, if she reaches for snacks, toys, trinkets, or other small items, then

we are confident that we can teach her to reach for a picture instead of reaching for the item.

Your child does *not* need to have wonderful fine motor skills. If she has trouble picking up small items, the picture can be modified so that it is easier to manipulate. For example, the picture can be glued to a wooden or foam block or a dowel, to aid in picking it up. The size of the picture can be modified as well to help in manipulation.

The child does not have to know the meaning of the picture before starting PECS. Our aim in the first part of PECS is to teach the child to initiate an interaction with another person, so there is no reason to precede teaching the exchange by trying to teach the meaning of the picture. Not until the third phase of PECS training (covered later in this Chapter) do we focus on assuring that users select distinct messages.

We are not aware of any cognitive prerequisites indicated by scores on a standardized developmental test. That is, a child does not have to reach a minimum developmental age before she can successfully learn PECS. Instead, it is critical to observe that the child can clearly indicate (such as by reaching for a toy) what is reinforcing to her in a form that can ultimately be modified to manipulating a physical symbol, such as a picture. Again, skills such as eye-to-eye contact, sitting quietly in a chair, responding to a series of simple instructions, or matching pictures to objects or other pictures are *not* prerequisites for PECS.

Finally, a child does not have to be nonverbal to benefit from PECS. The primary focus during the first phase of PECS is on teaching communicative initiation. Therefore, while PECS is frequently used with children who have no spoken words, it has also been used effectively with children who say some words but do not initiate with those words.

Who Is an Appropriate Candidate for PECS?

We have found the following series of questions very useful in determining whether someone would be helped by PECS:

1. Is the person currently using functional communication?
   If "no"—then PECS is appropriate
   If "yes"—then PECS *may be* appropriate

2. Is the communication modality understandable to unfamiliar people?
   If "no"—then PECS is appropriate
   If "yes"—then PECS *may be* appropriate
3. Is the person initiating functional communication?
   If "no"—then PECS is appropriate
   If "yes"—then PECS *may be* appropriate
4. Can PECS help expand vocabulary or the mean-length/complexity of the message?
   If "yes"—then PECS is appropriate.

What Are the Phases of Teaching PECS?

We've broken the sequence of steps to learn in PECS into six phases. In the first phase, children are taught to initiate communication. The second phase expands the use of pictures to other people, places, and rewards. In the third phase, making specific choices between pictures is addressed. The fourth phase teaches the child to construct simple sentences. At this point, we also begin to teach children to be more specific about what they want by teaching them how to use attributes to qualify their requests. The fifth phase assures that children can respond to the direct question, "What do you want?" while the sixth phase teaches children to comment about various items and activities.

This chapter covers Phases One through Four, and Chapter 7 continues with attributes as well as Phases Five and Six.

How to Begin Teaching PECS

Before we can begin to teach a child to communicate, there must be a reason for that child to communicate. In Chapter One, we noted two broad reasons to communicate: 1) to receive concrete objects, events, or actions; and 2) to receive social rewards, such as attention or praise. For very young children with autism, we have found that social rewards are not very effective motivators. Therefore, it will be more effective to teach communication about things that your child likes and that you can control access to.

Determining What Is Rewarding to Your Child

Before you can formally begin teaching PECS to your child, you need to determine what she likes—that is, to identify a number of potentially reinforcing items or rewards.

To do this type of reinforcer assessment, we must systematically observe what a child does. Note that there is no need to formally communicate with the child. While it would certainly be helpful to simply ask the child, "What do you like?" we can learn the answer by several other methods. First, we could ask the child's parents and other caregivers about the child's preferences. We can also carefully set up various situations and watch the child's actions. For example, we might simply hold a piece of candy in an open hand (or place it on a table) and observe whether or not the child takes the candy. We could also place several toys on a tabletop and observe which ones the child plays with (whether appropriately or in some unique fashion). We also observe what the child tends to spend a lot of time doing—we assume, for instance, that a child who stacks blocks over and over likes playing with blocks.

Ideally, we will find a set of items that the child likes. We also try to assure that not all of these items are types of food or drink. If all of her experiences involving PECS (or any other communication system) are linked only to snacks, then she will limit her use of communication skills to times when these snacks are available and not use them in other situations. In order for her to learn to use her new skill in a variety of settings, we must carefully plan to quickly introduce an array of opportunities to communicate.

Once we have determined which items a child likes, it is helpful to prioritize those items in a hierarchy. We do this by presenting the child with a choice between a pair of items. For example, we place a candy in one hand and a simple toy in our other hand, and observe which one the child reliably takes over a series of presentations. By pairing the candy with various items, we might determine that the child always selects candy as compared with other items. We next try this same type of comparison to determine the priority of other items offered to the child. We suggest continuing this prioritizing until you find items that the child clearly does not like—those she pushes away. Such items will be important when you want to teach the child to calmly reject some items or when you want to be certain of the child's choice between two items (e.g., "She likes candy but she hates pickles!").

During this preference assessment period, it is important to assess how much effort the child puts into obtaining whatever it is you are offering. It is unlikely that someone would work harder to communicate about something than they work to obtain the item directly. Therefore, if your child seems very passive or puts little energy into obtaining items, then we suggest first working on helping her indicate more definitely what she wants before you teach her to use PECS. Such effort may involve walking several feet to obtain something in view, prying open someone's fingers holding an item, or pushing aside a covering that is partially hiding a desired item. Essentially, if your child puts out little effort to obtain reinforcing items directly, she is not likely to put in more effort to obtain pictures corresponding to those items.

Sometimes when you are trying to figure out what is reinforcing for a child, it is helpful to look at what makes her protest. For example, your child may not actively approach the TV, but may watch if a cartoon-video is playing. Even more importantly, when you turn the TV off, she begins to whine and look around as if searching for what went wrong. Now is the time to begin a lesson because now she is most motivated to watch TV.

Phase One: Initiating Communication

The first step in PECS is to teach your child to initiate a request. Teaching strategies that require imitation or matching-to-sample as prerequisite skills often address spontaneous communication after children can imitate or respond to direct questions (such as, "What do you want?" or "What is this?"). We believe it is very important to teach children to be spontaneous communicators as quickly as possible, so initiation is the first goal of PECS.

Once you have found a powerful incentive as described above, introduce your child to PECS by teaching her to pick up and exchange a picture that corresponds to the item she wants. (See the sidebar on page 73 for information on making the picture.) First, you must ensure that your child will want the item when you are ready to begin teaching PECS. To increase the likelihood that she will, withhold the item from her for a period of time so that she comes to miss it. Then when you show her the item, she will be motivated to obtain it. Other strategies for enhancing your child's desire to gain access to an item are described in Table 6-1.

Table 6-1 | Communication Enhancement Strategies*	
1. Make favorite items inaccessible.	Place your child's favorite items out of reach but within view. Put the items on a high shelf, on a countertop, in clear containers with tight lids, etc. Don't automatically offer items.
2. Give small portions.	At meals or at snack time, offer bite-sized or small portions. Cut up a sandwich and give only part of it at a time. Put one or two swallows of a drink in a cup at a time. Help your child to understand that more is available by giving ***subtle*** cues such as saying "We have more juice," or by showing the food/drink item.
3. Consume a portion of a favorite food/drink in front of your child.	In view of your child, eat or drink a portion of the item she really wants. Show your extreme pleasure while consuming the item ("Boy is this JUICE good!!!")
4. Create the need for assistance.	Give your child access to a favorite item that he/she needs your assistance to enjoy. Encourage your child to seek assistance from you to wind the toy; turn on the TV, radio, tape recorder, computer, or something; open a container, etc.
5. Interrupt a favorite cooperative activity.	Begin a favorite activity that you and your child both participate in. Once you are both enjoying yourselves, stop the activity and encourage your child to signal to you that he/she wants to continue. For example, while pushing your child on the swing, stop her/him in mid-air.
6. Offer your child something that he/she does not like.	Offer your child a nonpreferred item/activity and encourage him/her to tell you "no" in an appropriate way.
7. Offer a choice.	Hold out two favorite items and say nothing. Expect the child to let you know which one he/she wants.

(continued on next page)

8. Violate your child's expectations.	Start putting together a puzzle with your child. After she has put in three or four pieces, give her a piece that obviously does not fit.
9. Surprise your child.	"Accidentally" spill, drop, or break something. Gasp and look at the "mess" and then at your child. Wait for a reaction.
*For a complete list of "Communicative Temptations," see: Wetherby, A.M. & Prizant, B.M. (1989). The expression of communicative intent: Assessment guidelines. *Seminars in Speech and Language*, *10*, 77-91.	
When using any of these strategies, once your child has initiated an interest in the item (looking at it, moving toward it, reaching for it, taking you to it), PAUSE and **WAIT. DO NOT** immediately prompt a response from your child (Do not ask "What do you want?" or say "Say, _____.") as this will likely result in imitation, direction following, or question responding. Waiting will enhance the likelihood that your child will spontaneously communicate with you!! Wait at least 5 seconds with an expectant look, raised shoulders, raised eyebrows, and then if your child has not responded, provide subtle prompts. These could include gesturing to his/her communication book, saying the initial sound of the word, or having a second person **MODEL** the response. Another technique is to say a "carrier phrase." For example, slowly say to your child "I want" and then pause expectantly after saying "want" and wait for your child to "fill in the blank."	

When the first PECS lesson is started, your child's focus will be on the enticing item. How do we teach her to pick up the *picture* of the item? When we first tried this lesson, we tried the natural approach—the person who was holding the enticing item also physically assisted the child in picking up the picture and giving it to the person holding the item. We noticed several problems with this approach. One, if you hold an item up to the child and use your other hand to help guide the child to pick up the picture, you will be out of hands to receive the picture from the child! But more importantly, we found that if the person enticing was also the one helping, then the child tended to simply wait for the help. The solution involves having two people helping at this point in training.

One person is directly in front of the child and entices her with something desirable as described in Table 6.1. This person (whom

we call the "communicative partner") uses no verbal prompts, thus avoiding simple questions or cues such as, "What do you want?" or "Give me the picture." These prompts tend to teach the child to wait for the question to be asked before responding. Furthermore, there is no reason to ask the question because we can interpret the child's reach as indicating what the child wants. When the child reaches for the enticing item, the second person, sitting or standing behind the child, guides the child to:

- pick up the picture (with whatever physical assistance is necessary),
- reach toward the first person, and
- place the picture in the open hand of the first person. The communicative partner immediately gives the child the item while saying the name of the item (see photo, next page).

For more detailed instructions about completing these steps, see "Designing Effective Phase I and Phase II Lessons" at the end of this chapter.

What Symbols Can Be Used with PECS?

As noted in the previous chapter, there are many symbols that can be incorporated into an alternative or augmentative communication system. We may use photographs, line drawings, product logos, or three-dimensional or miniaturized representations (such as kitchen magnets or actual items covered with resin). These symbols may be in black and white or color. Any of these types of symbols may be used in PECS as long as the child can easily manipulate them.

For some children, covering the picture with a laminate or contact paper will sufficiently protect the picture for repeated use and permit placement of material (such as Velcro™) to assist in attaching the symbol to a communication book. The backing of the symbol may need to be bolstered for some children. This support can be provided by thicker paper or cardboard, thin wood, plastic, or even metal (as from the lid of a frozen juice container). In situations when a child has physical difficulty in picking up or holding a picture, modifications of the symbol can be made via extensions (i.e., a wooden dowel attached to the symbol) or placing the symbol on a vertical vs. slanted board, providing a better angle for the child to grasp the symbol.

The role of the second person, the physical prompter, is (in this lesson) to reduce the physical assistance as quickly as possible. This reduction in help is best accomplished by using a strategy that at first glance seems backwards! That is, the physical prompter provides the child with physical help for picking up and reaching while eliminating assistance for letting go of the picture. Then, help is given for picking up the picture but eliminated (often in small increments over several opportunities) for reaching across to the open hand. This reduction in physical assistance can include changing the point of contact from the child's hand, to wrist, to elbow, etc. Finally, help is eliminated for picking up the picture. Formally, this strategy is called ***backward-chaining.***

How quickly this help can be eliminated depends on a number of factors, including how motivated the child is to obtain the item and how skilled the physical prompter is at providing and reducing assistance. The physical prompter can be another professional, a relative, or even another child as long as he or she has demonstrated effective use of this teaching strategy.

Some children with autism have learned this first phase of PECS within a few minutes, while other children have taken several days. You should gear the length of your teaching sessions to your child's degree of motivation. You certainly do not want the lesson to run until she no longer wants the item you are using to entice her—otherwise, you would be trying to make your child ask for something she doesn't want! Therefore, it is difficult to predetermine exactly how many op-

portunities to insist on. We try to end the session while the child is being successful and still wants the item we are using, knowing we will set up other opportunities across the day.

A time will come when you do not want to give your child everything she asks for every time she asks! Maybe you have run out of the requested item, or it is not yet time for the requested activity. In any event, you will need to say "no" to your child sometimes. We will describe several different ways to handle this situation in Chapter 7.

Keeping the Rewards Rewarding

As mentioned above, your teaching will become ineffective if your child is no longer interested in the reward you are using to entice communication. It is therefore important to carefully choose rewards, as well as to make sure they remain rewarding.

Some potential rewards are quickly consumed. For example, snack items and drinks disappear once the child eats or drinks. In similar fashion, bubbles, stickers, wind-up toys, electronic devices (especially if you control the remote!), or tops also tend to disappear or stop working on their own. With these items, when a child has requested and consumed the item, she will most likely want another similar item. In general, it is helpful to start with such consumable items, as long as they are not all food or drink items.

On the other hand, there are some rewards that a child may keep. Such items include a favorite toy, doll, book, or similar material item. In this case, once the child has been given the item requested, how do we entice the child to make another request?

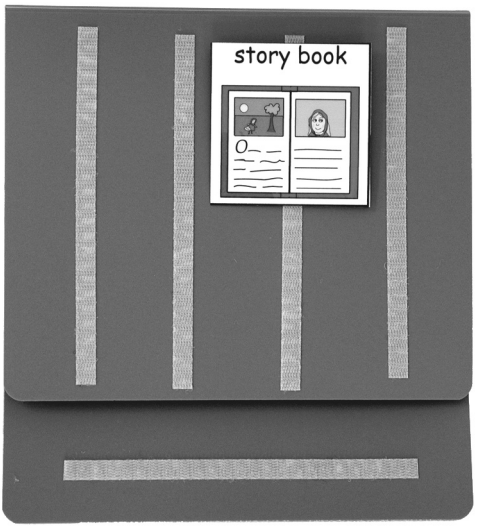
There are two strategies that can help. For some children, collecting more of their favorite item is still enticing. For example, a child who likes marbles may well be motivated to request other marbles from the teacher after she has been given one following her request. This way, she can accumulate many marbles.

The second strategy involves recovering the item by simply taking it from the child. In this case, we do not ask for the item, as that often involves a new lesson. Rather, we may say, "My turn" (merely to be polite) as we take the item back. If the child appears somewhat upset, another request is likely to follow as long as the physical prompter is ready to assist. Of course, if the child becomes so upset that she begins

to severely tantrum, hurting herself or others, the lesson should stop. We advise using a more "consumable" item for this part of training until the child has learned to reliably exchange a picture for a desired item.

Phase Two: Expanding the Use of Pictures

The next step in PECS training involves introducing more realistic aspects of communication. For example, during the initial session, the communicative partner is positioned immediately in front of the child and all she has to do is extend her arm to reach her partner with the picture. Obviously, this arrangement is not typical of the real world. Therefore, the communicative partner must begin to gradually move away from the child in order to foster greater persistence on her part.



In a similar vein, the initial lesson begins with the picture immediately in front of the child. This arrangement, too, is not typical of the real world. In this case, we must begin to move the picture further from the child but still keep it in plain sight so that she will expend more effort to obtain the picture to bring to the teacher.

At this point in teaching, we introduce a ***communication binder*** for the child. This may be a three-ring binder that has a square of Velcro affixed to the middle of the front cover. A single picture used to communicate is displayed on the outside of this binder (placed there by the teacher), while other pictures can be stored within (see photo). The child's family or teacher makes sure that the appropriate picture is on the front of the book depending on the current activity or interests of the child. This binder will help the child identify her own set of pictures, as well as provide a location to place all the pictures she eventually may use.

During this second phase of PECS instruction, we expand the number of motivational items and activities. For example, if we used candy as the first reward in the PECS lesson, then we must introduce other items. In this case, it will be important to add items that are not similar to the first item—that is, something other than food. We may use a favorite toy or access to music or the TV. We must keep in mind that our goal is to teach the child how to initiate functional communication in all situations in which she desires something, rather than as the system used only during snack- or mealtime.

In summary, the goal of this second part of teaching PECS is to increase the:

1. distance from the child to the communicative partner,
2. distance from child to the pictures, and
3. number of items that the child can request.

These goals are accomplished while assuring that only one picture is placed on the front of the communication binder at a time.

Why are there no choices of pictures at this point in training? The key to the first part in PECS training is to teach the child to approach an adult in a situation in which there is something the child wants or needs. Recall that in typical language development, children learn to approach adults to communicate even before they have any formal message (i.e., words) to use. The goal in PECS is to achieve the same spontaneous approach even if the child has yet to learn to be selective about messages. Just as for children who acquire speech in the typical pattern, children learning PECS will learn to clarify their message after they have learned to communicatively approach someone.

Phase Three: Choosing the Message within PECS

Once children have learned the essence of communication—finding someone to communicate with—they then are ready to learn how to select specific messages. This involves learning to discriminate between pictures.

In teaching a child to discriminate between pictures, we need to individualize the teaching strategies as well as the type of symbols (i.e., photographs, line drawings, etc.) used. Although these issues are often entwined pragmatically, we will discuss teaching strategies before we describe message selection issues. Throughout the description of these teaching strategies, we will refer to the symbols as "pictures." Note: At this stage of PECS training, only one trainer will be needed, since the child initiates communication without physical assistance at this point.

Teaching Strategies for Message Selection

Life would be considerably simpler if there were one perfect teaching strategy to help children select from a choice of messages. In our experience, we have found instead that there are a number of helpful techniques to help children learn to discriminate between symbols. We will discuss some of the primary options, but strongly suggest readers look at the references provided at the end of the chapter for a more complete description of discrimination techniques.

During the first two phases of PECS training, children are presented with only one picture at a time. With only one picture to choose from, there is no way of knowing whether the child is connecting the symbol depicted with the item she is requesting. When we begin discrimination training, we place a second picture on the communication book in order to make sure the child understands how the pictures are related to specific items. To begin with, one picture will be associated with something that the child greatly prefers. There are several options for selecting the second picture (the distracter picture).

The distractor picture can be:

1. Associated with something that is either neutral or disliked or
2. Something that looks very different from the first item

Using Pictures of Neutral or Disliked Items as Distractors. Using this option, you use a distractor picture of something that is either neutral (something boring such as a tissue, a piece of paper, etc.) or something that the child clearly doesn't like (pickles, lemons, etc.). We must determine which items are nonpreferred or disliked for each child. Their dislikes are as unique and individual as are their preferences. This strategy focuses on maximizing the difference in the value of each item for the child.

If we use this picture array (one picture of something preferred and the other picture of something nonpreferred or disliked), we give the child the corresponding item when she gives us a picture. For example, if the choice is between candy and a wooden spoon, when the child gives the candy picture, we provide candy; when the child gives the spoon picture, we give her the spoon. This strategy generally is successful if the child appears to be somewhat upset when handed the spoon. That is, if the child gave us the spoon picture and then pushed away the offered spoon, she is more likely to pay attention to the pictures to assure getting candy, and not the spoon. However, if the child calmly accepts the spoon and even begins to play with it, this strategy will not help the child be more careful in selecting pictures. In this case, choose another second item—something that the child is more likely to object to receiving!

Using Distinctly Different Pictures as Distractors. A second option in selecting the distractor picture is to choose something that looks very different from the first picture. For example, the second picture can be completely blank. Thus, the choice is between a picture of the item the child likes and a second picture that is simply white. This strategy maximizes the visual differences between the two pictures. There are several other ways to emphasize the visual differences between two pictures, including

a. Color of item (e.g., one picture is black and white, and the other is in color)
b. Color of background (e.g., the background of one picture is white and the background of the other picture is yellow)
c. Size (e.g., one picture is very large and the other is very small) In each case, the distractor should be related to something your child does not prefer.

If we use this type of strategy, then we must quickly but gradually eliminate the prompt provided to help your child. For example,

if your child can reliably select the regular picture when it is paired with a blank distractor, then you must make the blank card gradually more similar to other pictures. On the other hand, if you used differing colored backgrounds to help your child make selections, then you must gradually make those backgrounds the same. Whichever prompt you introduce to help your child make correct selections, you must gradually remove so that she learns to select pictures solely because of the contents of the pictures themselves.

Issues Associated with Successful Discrimination Training

Whichever discrimination training strategy is used, several broad issues must be systematically addressed:

1. how and when to provide feedback,
2. how to correct errors, and
3. how to make sure the child discriminates between two desired items.

Providing Feedback. In the first part of PECS, we wait until the child has given us the picture before we respond by providing whatever the child requested. However, in discrimination training, we now are focused on teaching the child to *select* the correct picture, since she has previously learned to hand us a single picture. Therefore, providing some vocal feedback (as in voicing "Oh!") or visual feedback (as in showing the desired item) at the point of picture selection will hasten the acquisition of this skill. This immediate feedback signals the child that she will soon receive the requested item. While we may respond vocally as the child selects a picture, we only provide the item when the student puts the picture into our hand.

Responding to Errors. Another general issue is how to react to the errors that children may make at this point in training. How should we respond to the child who rejects being handed the nonpreferred item? How should we respond to errors within a lesson?

The key is recognizing the difference between fixing the problem (which does not lead to new skills) and arranging to teach the appropriate response. For example, when we point to the right picture after the child has made an error, she is likely to pick up and give that picture, thus appearing to fix the problem. However, in this lesson, she is supposed to learn to select a picture from a pair of pictures, not take a picture pointed to by the teacher. It is important to respond to errors using a consistent strategy rather than simply repeat the sequence and risking repeating the errors. Remember, there is no one perfect way to teach discrimination, so you must be ready to systematically evaluate alternative strategies.

One strategy to correct errors within these types of discrete lessons—the ***4-Step Error Correction Strategy***—involves taking time to go through a series of steps. For example, when shown a candy and a sock, if the child hands you the picture of a sock, and you are sure that she really doesn't want the sock, then:

1. Place both pictures back in their original position and show her the correct picture by pointing or tapping upon the candy picture.
2. Prompt her to practice giving you the candy picture (via holding your hand close to that picture, covering the other picture, etc.).
3. Provide praise for giving you the candy picture but do *not* give her the candy yet—after all, she is simply following your prompt at this point.
4, Repeat the first step by showing her both items. Now if she touches the candy picture, provide some feedback ("Oh!") and when she gives you the candy picture, give her some candy.

It is essential for teachers to be proficient at this strategy before trying any of the alternative discrimination strategies noted in the following section. In our experience, when children show difficulty in discrimination it is often because teachers are not using the most effective strategies, not that because there is a fundamental problem with the pictures being used. For more information about error correction strategies see *Autism 24/7: A Family Guide to Learning at Home and in the Community* (Bondy & Frost, 2008).

What To Do When Someone Does Not Look at the Pictures. Sometimes people with autism reach for a picture—perhaps even the correct picture!—without looking at the picture. Even in the case of

a lucky guess, we should not reward reaching without looking. We suggest simply placing your hand on the picture and thus blocking this type of response.

If this strategy does not lead to more persistent looking before reaching, then hold up the binder with the picture choices at the user's eye level. If you hold the binder and picture just out of arm's reach, you should see when the child looks at the picture. Then immediately hold the book closer so that the child is rewarded with access to the picture when she looks at it. (Notice, this strategy is very hard to do if the book is flat upon the tabletop.) Once you see consistent looking before reaching, you may try slowly moving the binder in order to encourage improved tracking of the location of the picture, thus helping to promote visual scanning.

Discriminating Between Pictures of Two Desired Items. Once a child successfully selects from an array of two pictures, we gradually add more pictures. As more pictures are included, we begin to offer the child a choice between items that are more and more similar in preference. In time, the choice may be between two types of cookies or two types of chips. In such cases, how do we know what the child truly desires?

When we offer two equally preferred items, we seek to determine whether there is correspondence between what the child requests and what she wants. Therefore, in situations in which the child enjoys both (or many) of the items, we say, "OK, take it" when the child gives us a picture. Then we watch the child to be certain that she takes the item she requested. If she reaches for the chocolate cookie after giving us the vanilla cookie picture, then we assume an error was made. We also assume the child really wants the chocolate cookie (since that was the item she reached for), so we teach her to select the chocolate picture in order to take that type of cookie. Here, too, if an error is made, a systematic error correction strategy must be used.

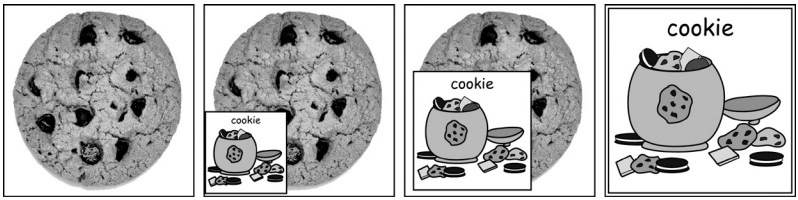
Once a child can discriminate between two pictures, we present her with three, then four, then five pictures representing preferred items. We build an X-pattern with these pictures, rather than lining them up left to right. This strategy helps promote visual scanning in all directions. We periodically "check" the child's accuracy by having her "Go get" what she asked for. Eventually, the student learns to discriminate from among all pictures on the cover of and in her communication book.

Progressing to More Symbolic Pictures. Some people need to use three-dimensional or miniaturized representations or items

instead of pictures in the beginning of PECS training. As their repertoire grows, it is important to see if such symbols can be replaced by less bulky two-dimensional representations. The following example provides clarification on this point as well as suggesting the flexibility we must provide to some children.

Donna was eight years old and had successfully learned the first steps of PECS. However, when her teacher and I began to work on discrimination, we encountered numerous problems. Finally, we found that if we used three-dimensional items, discrimination was easier for her. Over time, she gradually became successful at discriminating among 60 symbols. However, her communication book was now very large and bulky, and Donna was having difficulty carrying it!

We began to place a small picture of the item on the lower left portion of her three-dimensional symbols. At first, these pictures covered about 10 percent of the total surface of the object. Even this small change initially resulted in a modest reduction of her discrimination accuracy, but that soon recovered. At that point, we covered a somewhat larger portion of the three-dimensional symbol with a slightly larger picture. Again, even though the change looked minor to us, Donna's performance dropped before once more recovering. Over the next few months, we continued to cover her three-dimensional symbols with pictures until, finally, she discriminated all of her symbols using pictures alone. As we added new vocabulary, we generally first had to introduce the symbol with a three-dimensional symbol before gradually replacing it with a picture. (See Frost & Scholefield, 1996, for details.)



Phase Four: Introducing Sentence Structure within PECS

One day, my sixteen-month-old daughter came to me and said, "Doggie!" while pointing to our dog running in the yard. Later that same

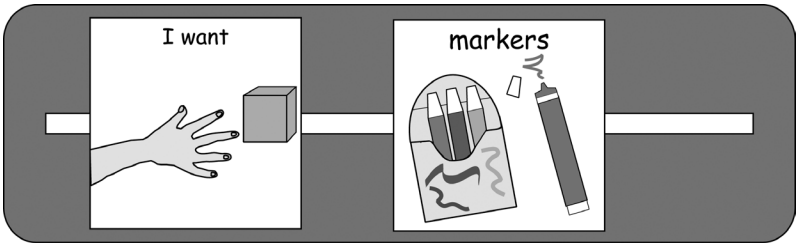
day, she came over and again said, "Doggie?" but in a manner that led me to believe she was looking for her favorite stuffed animal. Even though she used the same word, she made it clear when she was commenting about something as opposed to when she wanted something. Her tone of voice, including inflection, prosody or rhythm, and other qualities of voice were the cues I used to better understand her message.

When children developing typical language are at a point in their use of words when they use only one word at a time, they alter how they say a word in order to help others understand their meaning. Early in the use of PECS, children use single pictures to make a request. However, in time, we hope to teach children to use communication to comment about things and events in their surroundings. How will we interpret a child's meaning if they only give us a single picture? Is there a way to teach children using PECS to indicate whether they are using a picture as a request or a comment? One solution is to teach them to form simple sentences to indicate either "I want …." or "I see …."

With our long-term goal in mind, we must introduce a new structure to help children use pictures to express different communicative purposes. Rather than try to teach a child a new structure and a new communicative function at the same time, we prefer to just add one new skill per lesson. Therefore, we will first teach a new language structure (sentence) and then teach a new function (commenting). (See the next chapter for information on teaching commenting.)

We introduce the new structure using the function that the child already uses—requesting. First, we design a Sentence Strip (see below) that can be readily removed from a communication book and on which pictures may be placed to construct a sentence. We design a picture with an icon representing "I want." (We do not use a separate icon for "I" and "want." At this stage, it is not possible to teach what "I" means because the child doesn't have any other pronoun in her picture vocabulary yet to contrast with "I").

We teach this lesson by starting with the "I want" picture already on the Sentence Strip, guiding the child to place the picture of what she wants on the Sentence Strip. The child is then guided to exchange the entire Sentence Strip. The child is then taught to place both the "I want" icon and the picture of what is desired onto the Sentence Strip before giving the strip to someone.



When we are handed the completed Sentence Strip, we encourage the child to touch each picture while we "read" the sentence to the child (i.e., "I want cookie."). While the child is learning where to place each picture and what to do with the entire Sentence Strip, we read the Sentence Strip quickly so as not to delay giving the requested item.

Once the sequence has become fluent, we introduce a pause between saying, "I want" and the name of the picture of the desired item. This pause tends to encourage children to initially imitate and often say the final spoken word before we do. Although we use this delay strategy to encourage and create opportunities for vocalization by the child, we do not insist on imitation, even for those children who may be speaking. That is, the expectation is on using PECS, not on making the child speak. Several people have reported to us that some children who are pressured to comply with vocal imitation within a PECS exchange begin to avoid using PECS as a way of avoiding the vocal imitation that they find difficult.

Designing Effective Phase I and II Lessons

Materials Needed:

Two or three powerful rewards. It may help to use rewards that are readily "consumable." For example, snacks, drinks, bubbles, spinning tops, music, or TV (where you control the remote!), etc. If you use toys, books, or other favorite objects, you will need to either have many of them or you will need to get the item back from the child to entice another communicative opportunity.

Pictures, photographs, product logos, or some other type of visual symbol associated with each reward. The pictures should be sturdy enough to handle frequently. Covering the picture with contact paper or lamination will help preserve the picture. The pictures should

be about two inches by two inches. Avoid small pictures (pictures less than one inch by one inch) to begin with!

Prerequisites:

The child has been observed to seek out several powerful reinforcers.

People Needed:

Two teachers. One person entices with the reward (and gives the reward when a successful request is made) and the other teacher assists with physical prompting.

Physical Arrangement:

Begin with the child in between the two teachers, within arm's length of each teacher. The picture should be placed between the child and the teacher holding the reward.

The child does not have to be seated in a chair. Remember, we arrange this lesson wherever the most powerful rewards are found. Sometimes, that will be on the floor, in the sandbox, in front of the TV, or in some other interesting location. The teacher providing the physical assistance should be behind the child.

Starting the Lesson:

Scenario: John and Alexis are Sam's teachers.

Sam likes raisins. John will entice Sam with the raisins, and Alexis will physically help Sam pick up, reach, and release the picture into John's hand. There is a picture of a raisin on the table where Sam is sitting. (Note: It is ***not*** *necessary for Sam to sit to start this lesson—go where the reinforcer is!)*

1. At the start of the lesson, John holds up a raisin but does not say anything. Sam sees the raisin and reaches for it. John lets Sam have this raisin (using a "first one's free" strategy).
2. After Sam finishes that raisin, John holds up another raisin. Sam again reaches for it. Alexis immediately guides Sam's reaching hand to the picture, fully assists in helping him pick it up and place it into John's open hand (which John held open after he saw Sam reach for the raisin).
3. As soon as the picture touches John's hand, he says, "Raisin!" while immediately giving Sam the raisin.

4. Repeated trials are offered as long as it is apparent that Sam is still motivated to reach for the raisin. Over these trials, Alexis gradually reduces her physical assistance for the release, then the reach, and finally for the pick-up. Throughout the trials Alexis says nothing and is not involved in rewarding Sam for his actions.
5. As Sam begins to pick up the picture without assistance, John and Alexis switch roles. Alexis entices with the raisin and Sam immediately gives her the picture.
6. Training is now introduced during other highly motivating activities for Sam, such as for his favorite toy, a book he likes to look at, his choice of drinks (today it's orange juice but tomorrow it may be milk!), and related activities. These lessons also take place in various parts of the classroom as well as in different rooms at home. Opportunities to communicate are created throughout the day.

References & Resources

Bondy, A. & Frost, L. (1994). The Picture-Exchange Communication System. *Focus on Autistic Behavior 9*, 1-19.

Bondy, A. & Frost, L. (2008). Autism 24/7: A Family Guide to Learning at Home and in the Community. Bethesda, MD: Woodbine House.

Bondy, A. & Frost, L. (2009). Generalization issues pertaining to the Picture Exchange Communication System (PECS). In C. Whalen (Ed.), *Real Life, Real Progress for Children with Autism Spectrum Disorders: Strategies for Successful Generalization in Natural Environments*. Baltimore, MD: Paul Brookes Publishing Company.

Bondy, A. & Sulzer-Azaroff, B. (2002). *The Pyramid Approach to Education In Autism.* 2nd Edition. Newark, DE: Pyramid Educational Products, Inc.

Frost, L. & Bondy, A. (2002) *The Picture Exchange Communication System (PECS) Training Manual.* 2nd ed. Newark, DE: Pyramid Products, Inc.

Frost, L. & Scholefield, D. (May, 1996). Improving picture symbol discrimination skills within PECS through the use of three-dimensional objects and fading: A case study. Paper presented at the Association for Behavior Analysis. San Francisco, CA.

Sulzer-Azaroff, B., Hoffman, A., Horton, C., Bondy, A., & Frost, L. (2009). The Picture Exchange Communication System (PECS): What do the data say? *Focus on Autism*, *24*, 89-103.