Picture Exchange Communication System (PECS): An Evidence-Based Practice

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What is the Practice?

The Individuals with Disabilities Education Act of 2004 indicated that individuals with autism spectrum disorder (ASD) typically demonstrate significant challenges associated with verbal and nonverbal communication and social interaction. To address to the common communication challenges that this group experiences, many special education instructors and speech-language pathologists use the Picture Exchange Communication System (PECS; Frost & Bondy, 2002), an evidence-based practice designed to improve communication skills for children with ASD. PECS is a behaviorally-based, pictorial communication system in which children learn to communicate with a partner by exchange of picture communication symbols.

How to Implement PECS (adapted from Frost & Bondy 2002)

Prior to implementing PECS, teachers conduct reinforcement sampling to identify items that the focus student desires. Teachers prepare pictures of those preferred items such as favorite toys or snacks. PECS instruction is then conducted over six phases (see Figure 1). In the first Phase of PECS, learners use picture communication symbols to make requests with hand-over-hand assistance. For example, a learner exchanges a picture of a banana to request an actual banana. Learners are then taught to exchange pictures to make requests with a variety of partners over a variety of contexts. Learners are also taught to make requests by discriminating between picture symbols (i.e., first between pictures of a preferred and a non-preferred item, and later between pictures of two preferred items). In later phases of PECS training, learners are taught to make requests in response to an adult prompt (i.e., "What do you want?"). Learners are also taught to use attributes (e.g., "big", "yellow") and to build sentence-strips in order to make requests (e.g., "I want a big banana.") and comments (e.g., "I see a banana.").

What Evidence Supports the Use of PECS?

A growing body of research studies supports the use of PECS to improve communication skills for young children with ASD. Recently, four separate groups of researchers (Flippin, Reszka, & Watson, 2009; Ganz, Davis, Lund, Goodwin & Simpson, 2012; Preston & Carter, 2009; Tincani & Davis, 2011) conducted meta-analyses, or systematic investigations aimed at summarizing findings of individual research studies. Overall, meta-analytic results uphold the use of PECS to improve communication skills among young children with ASD. Further, research has indicated that PECS interventions result in especially important gains for young children with ASD in two cases. First, children of preschool age tended to demonstrate the strongest communication gains. Additionally, participants who participated in more phases of PECS instruction had the best outcomes (Ganz, Davis, Lund, Goodwin & Simpson, 2012).

Despite research support for PECS in improving communication skills, evidence for use of PECS to improve speech among children with ASD is not as strong. Results of a few single case studies indicated that

interventions including later phases of PECS (i.e., Phases III and IV, when verbal models and questions are introduced) may result in larger gains in speech (Flippin, Reszka, & Watson, 2009). In addition, emerging evidence suggests that PECS may result in more robust speech improvements in comparison to other interventions for children with a specific developmental profile (i.e., low joint attention, low motor imitation, and high object exploration; Flippin, Reszka, & Watson, 2009). Overall however, further research is needed to determine the effectiveness of PECS in improving speech outcomes for children with ASD.

Benefits and Barriers of PECS
Several features of PECS make the program a widely popular communication intervention for children with ASD. First, no pre-requisite skills are required for learners prior to PECS training. Children with limited eye contact, gestures, and verbal imitation skills can participate in PECS. Next, PECS interventions are simple to implement and training is minimal (e.g., two-day workshop). Finally, PECS employs reinforcers to shape communication skills; therefore, it is motivating for participating children.

There are several limitations associated with PECS. First, the range of communicative functions targeted in the approach is restricted. For example, in the first five phases of the program, students are taught to make requests, which is a limited communicative repertoire. Comments are trained in the final phase of PECS (i.e., Phase VI: Commenting in Response to a Question). However, these comments are trained as responses to adult questions (i.e., "What do you want?"; "What do you see?") and then questions prompts are faded.

Spontaneous, self-initiated comments are not targeted (e.g., "Look there's a train"; "The train has a whistle"; "The train is rolling down the hill"; "The train is going to the roundhouse"). In addition, other early-emerging communicative functions, such as protests and refusals (e.g., "No, I don't want a banana"; "I don't want to do that"; "I'm not going") are also not directly targeted in PECS. Finally, as PECS is a pictorial communication system, preparation of picture communication symbols can be labor intensive for interventionists, and the need to carry a communication book with limited vocabulary choices can be restrictive for children.

Recommendations for Future Research and Practice
Further research is needed to examine the generalizability of speech and communication gains following PECS instruction. Researchers should also examine and identify child characteristics (e.g., joint attention, object exploration; imitation, age, gender, race, ethnicity, native language) that may impact the effectiveness of PECS. Finally, researchers should compare outcomes of PECS to that of other interventions designed to improve speech and communication among students with ASD.

Summary
Given the evidence that supports PECS instruction, practitioners should confidently select PECS as an EBP to improve expressive communication skills among young children with ASD.

Additional Resources
For more information and PECS resources, please see Pyramid Educational Products, Inc. at http://www.pyramidproducts.com/

Figure 1. Six Phases of PECS Training (adapted from Frost & Bondy, 2002)

PECS Phase	What to Do
Phase I: Teaching the Physically Assisted Exchange	Two trainers physically prompt the child to request a desired item by exchanging a single picture of an item for the actual item.
Phase II: Expanding Spontaneity	A communication book with pictures of preferred items is introduced, and increased distance is placed between child and communication partner. In this phase, the child is taught to get a picture symbol from the communication book and travel to a communicative partner to request an item. Communication partners, contexts, and placement of picture symbols in the communication book are varied to encourage generalization.
Phase III: Picture Discrimination	The child makes requests by discriminating between two picture symbols; first between a highly desired vs. non-desired item, and then between two desired items.
Phase IV: Building Sentence Structure	The child constructs a two-picture-sequence sentence strip (i.e., "I want" symbol, and a picture symbol) to request a preferred item. In this phase, verbal models are introduced. The communication partner gives the verbal model (i.e., "I want...") and provides a time delay, before labeling the requested item, and handing both the item and sentence strip back to the child.
Phase V: Responding to "What do you want?"	The communicative partner verbally asks the learner "What do you want?" paired with a time delay, and a gestural prompt toward the "I want" picture symbol. The goal of phase V is for the child to begin answering the question before the communicative partner uses a gestural prompt.
Phase VI: Commenting in Response to a Question	Comments are trained. The child is taught to build sentence strips (e.g., "I see banana.") in response to the partner's verbal questions (e.g., "What do you see?"; "What do you want?"). Question prompts are then faded.

References

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