

PICTURE EXCHANGE COMMUNICATION SYSTEM (PECS)

CHARACTERISTICS OVERVIEW CHART

Verbal Skills	Grade Levels	Cognitive Level	Areas Addressed
<input checked="" type="checkbox"/> Nonverbal	<input checked="" type="checkbox"/> PK	<input checked="" type="checkbox"/> Classic	<input type="checkbox"/> (Pre)Academic/Cognitive/Academic
<input checked="" type="checkbox"/> Mixed	<input checked="" type="checkbox"/> Elementary	<input type="checkbox"/> High	<input type="checkbox"/> Adaptive Behavior/Daily Living
<input type="checkbox"/> Verbal	<input checked="" type="checkbox"/> Middle/High	Functioning	<input checked="" type="checkbox"/> Behavior
			<input checked="" type="checkbox"/> Communication/Speech
			<input checked="" type="checkbox"/> Social/Emotional

BRIEF INTRODUCTION

Pyramid Educational Consultants, developers of the Picture Exchange Communication System (PECS), describe PECS as an augmentative alternative communication system (AAC) that teaches children and adults with autism (AU) and other communication deficits to initiate communication (Frost & Bondy, 2002). PECS begins with teaching a student to exchange a picture of a desired item with a “teacher” who immediately honors the request.

DESCRIPTION

The PECS training protocol is based on applied behavior analysis (ABA) techniques, whereby functional communication is systematically taught using prompting and reinforcement strategies that lead to independent communication. PECS also teaches discrimination of symbols and then sequencing to create simple sentences. In the most advanced phases, individuals are taught to comment and answer direct questions.

PECS consists of five stages:

Phase I: Teaches students to initiate communication right from the start by exchanging a single picture for a highly desired item.

Phase II: Teaches students to be persistent communicators – to actively seek out their pictures and to travel to someone to make a request.

Phase III: Teaches students to discriminate pictures and to select the picture that represents the item they want.

Phase IV: Teaches students to use sentence structure to make a request in the form of “I want _____.”

Phase V: Teaches students to respond to the question, “What do you want?”

Phase VI: Teaches students to comment about things in their environment both spontaneously and in response to a question.

Expanding Vocabulary: Teaches students to use attributes such as colors, shapes and sizes within their requests.

The following illustrates a PECS system using a 3-ring notebook and Velcro™ strip that allows individual pictures to be moved around depending on their function.

SAMPLE PECS NOTEBOOK

From the Geneva Centre on Autism (www.autism.net). Used with permission.



BRIEF EXAMPLE

Joena’s speech-language pathologist and special education teacher introduced this nonverbal 6-year-old to PECS. She progressed quickly through the first three stages. As she began Phase IV, she started to vocalize “I want” when using the PECS system.

SUMMARY

PECS uses ABA to teach individuals with autism how to initiate communication with others.

Although PECS uses picture symbols and other visual cues, PECS should be viewed as a specific instructional protocol to teach communication skills.

RESEARCH TABLE

Number of Studies	Ages (year)	Sample Size	Area(s) Addressed	Outcome
50+*	1-17	635+	Language production, communication, behavior	+ results for teaching requests, mixed results for increased speech

*Note: Includes integrated reviews of literature by Flippin, M., Reszka, S., Watson, L.R. (2010), Hart, S.L. & Banda, D.R. (2010), Tien (2007) and Preston & Carter (2009) including overlapping studies.

STUDIES CITED IN RESEARCH TABLE

1. Cannella-Malone, H.I., Fant, J.L., Tullis, C.A. (2010). Using the picture exchange communication system to increase the social communication of two individuals with severe developmental disabilities. *Journal of Developmental Physical Disabilities, 22*, 149-163.
An extension of the PECS protocol involving the use of peers was evaluated with a multiple-baseline-across-behaviors design for two severely impaired girls with PDD-NOS & ASD. The girls were taught to make greetings, requests, and responses to peers with the guidance of a peer tutor and model. For one participant there were clear improvements in request and responses with moderate improvements for greetings. For the other participant, only a moderate effect for requests was seen.
2. Dogoe, M.S., Banda, D.R., Lock, R.H. (2010). Acquisition and generalization of the picture exchange communication system behaviors across settings, persons, and stimulus classes with three students with autism. *Education and Training in Autism and Developmental Disabilities, 45(2)*, 216-229.
This study reports the effects of providing PECS instruction on the requesting behavior of 3 children with ASD. None of the three participants made any independent requests during baseline, but following the introduction of PECS instruction all three participants quickly developed the behavior of making independent requests and progressed through multiple PECS phases involving making progressively more complex request responses.
3. Flippin, M., Reszka, S., Watson, L.R. (2010). Effectiveness of the picture exchange communication system (PECS) on communication and speech for children with autism spectrum disorders: A meta-analysis. *American Journal of Speech-Language Pathology, 19*, 178-195.
The authors review 11 studies (8 single-subject and 3 group-design studies) evaluating the use of PECS intervention according to both size of effects for desirable outcomes (communicative responses and amounts of speech) and the quality of evidence presented based on the experimental design used and data presented. They conclude that PECS has a positive effect on the amount of communication of children with ASD, but no consistent or significant impact on the amount of speech of children who receive the intervention. They also identify several characteristics of children with ASD that predict a positive response to PECS intervention: limited joint attention, stronger object exploration, and limited motor imitation.
4. Ganz, J.B., Heath, A.K., Rispoli, J.M., Earles-Vollrath, T.L. (2010). Impact of AAC versus verbal modeling on verbal imitation, picture discrimination, and related speech: A pilot investigation. *Journal of Developmental Physical Disabilities, 22*, 179-196.
The purpose of this study was to evaluate the impact of PECS intervention on independent picture requests, imitated verbalizations, picture discrimination tasks, and other speech of a 3-yr old child with ASD. In an AB design, the authors found an increase in picture requests, but no effects of PECS on the other three dependent measures. Independent requests

generalized to novel pictures and maintained in the absence of formal PECS stimuli (when only verbal modeling were provided).

5. Ganz, J.B., Lashley, E., Jenkins-Rispoli, M. (2010). Non-responsiveness to intervention: Children with autism spectrum disorders who do not rapidly respond to communication interventions. *Developmental Neurorehabilitation, 13(6)*, 399-407.
This case report explored the reasons why two young children with ASD did not respond to PECS intervention. The authors identify the near absence of spontaneous speech and echolalia and the presence of co-morbid health conditions as factors that appeared to be most associated with failure to respond to intervention.
6. Hart, S.L. & Banda, D.R. (2010). Picture exchange communication system with individuals with developmental disabilities: A meta-analysis of single subject studies. *Remedial and Special Education, 31(6)*, 476-488.
In a review of 13 studies (36 total participants) utilizing PECS, the authors synthesized the results of the interventions on communicative, speech, and problem behaviors and also conducted quantitative analysis of research findings. They report that PECS led to increases in communicative behavior in the vast majority of participants, but only occasionally led to increased speech or a reduction in problem behaviors. Additionally, only 54% of studies reported generalization of skills from trained to untrained targets following PECS intervention. PECS did generally receive high social validity ratings.
7. McConkey, R., Truesdale-Kennedy, M., Crawford, H., McGreevy, E., Reavey, M., Cassidy, A. (2010). Preschoolers with autism spectrum disorders: Evaluating the impact of a home-based intervention to promote their communication. *Early Childhood Development and Care, 180(3)*, 299-315.
This study evaluated the effects of a 9-month early intensive intervention program on the adaptive functioning of 35 children with ASD relative to a control group of 26 children with ASD who did not receive intervention. The intervention (based on TEACCH and PECS intervention models) was implemented by family members and supervised by speech therapists. Following treatment, only the intervention group showed significant improvement on both autism rating scales (GARS) and IQ scales (Vineland).
8. Yoder, P.J. & Lieberman, R.G. (2010). Brief report: Randomized test of the efficacy of picture exchange communication system on highly generalized picture exchanges in children with ASD. *Journal of Autism and Other Developmental Disorders, 40*, 629-632.
This study reported an intervention to evaluate the use of PECS versus milieu teaching of communication across two groups of children with ASD (19 in PECS, 17 in milieu). Children were randomly assigned to each group, and their use of picture exchange behaviors was measured pre and post 6 months of intervention. Only children in the PECS condition showed increased use of picture communication, but otherwise the groups were similar post-intervention. It is not surprising that only children in the PECS condition acquired picture exchange skills since they were explicitly taught in that condition and not taught in the other condition.

9. Preston, D., & Carter, M. (2009). A review of the efficacy of the Picture Exchange Communication System intervention. *Journal of Autism Developmental Disorders, 39*, 1471-1486.
A descriptive review is provided of the 27 studies identified, which included randomized controlled trials (RCTs), other group designs and single subject studies. Available research provides evidence that PECS is readily learned by most participants and provides a means of communication for individuals with little or no functional speech. Very limited data suggest some positive effect on both social communicative and challenging behaviors, while effects on speech development remain unclear. (Note seven of these studies are cited elsewhere in this list. The 20 remaining studies included 292 participants.)
10. Charlop, M. H., Malmberg, D. B., & Berquist, K. L. (2008). An application of the Picture Exchange Communication System (PECS) with children with autism and a visual impaired therapist. *Journal of Developmental and Physical Disabilities, 20*, 509-525.
In the present study, a multiple baseline reversal design across children was used to explore the viability of a Braille-modified PECS system for use between a visually impaired therapist and three nonverbal children with autism (ages 5 through 9). The PECS cards were slightly modified with the addition of Braille labels so that the visually impaired therapist would be able to understand and respond to the requests of the children with autism. Results indicated that the addition of Braille labels allowed children with autism and the visually impaired therapist to communicate with each other using PECS. In addition, children had ancillary decreases in problem behaviors during work sessions with the Braille-modified PECS.
11. Ganz, J., Simpson, R., & Cook, K. (2008). Generalization of a pictorial alternative communication system across instructors and distance. *Augmentative and Alternative Communication, 24*, 89-99.
This study examined the use of a modified PECS strategy to teach functional communication that will generalize across instructors to a 12-year-old boy with autism. Results demonstrated that over the 12 sessions of the study, the participant increased spontaneous communication through the use of PECS and generalized across multiple instructors.
12. Lund, S., & Troha, J. (2008). Teaching young people who are blind and have autism to make requests using a variation on the Picture Exchange Communication System with tactile symbols: A preliminary investigation. *Journal of Autism and Developmental Disorders, 38*, 719-730.
This study employed the teaching strategies from PECS to teach three girls (ages 12-17) to use tactile symbols as a means of communication. Over the 35-week study, only one of the participants successfully completed all three phases of the study; however, all participants increased their use of the tactile symbols for communication.

13. Tien, K. (2008). Effectiveness of the Picture Exchange Communication System as a functional communication intervention for individuals with autism spectrum disorders: A practice-based research synthesis. *Education and Training in Developmental Disabilities, 43*, 61-76. This review of the literature on the efficacy of PECS examined 13 studies that involved 125 participants with autism ages 1-12 years. The author concluded that overall the available evidence indicates that PECS is an effective evidence-based practice for enhancing functional communication for individuals with autism.
14. Carr, D., & Felce, J. (2007). The effects of PECS teaching to Phase III on the communicative interactions between children with autism and their teachers. *Journal of Autism and Developmental Disorders, 37*, 724–737. This study examined the ability of 24 children with autism (ages 3-7 years) to master the use of PECS to Phase III during the five-week study period. Participants demonstrated increases in initiation of communication as well as dyadic or two-way communications.
15. Howlin, P., Gordon, K., Pasco, G., Wade, A., & Charman, T. (2007). The effectiveness of Picture Exchange Communication System (PECS) training for teachers of children with autism: A pragmatic, group randomized controlled trial. *Journal of Child Psychology and Psychiatry, 48*, 473-481. This study was designed to assess the influence of formal PECS training and consultancy for teachers on the use of PECS by 84 elementary school students with autism. Results showed that over the five months of the study, the participants increased their use of PECS; however, there was no increase in the frequency of speech and no maintenance of skills after the intervention was eliminated. The authors concluded that the formal teacher training had little effect on student outcomes.
16. Chong, R. (2006). The teaching of functional language skills in a second language to a child with autism. *Kata, 8*, 89-100. The purpose of this study was to determine whether it was possible to teach one 6-year-old Chinese boy with autism to develop a second functional language (English) through the use of PECS. Over the five phases of the study, the participant was able to develop both spontaneous communication with the use of PECS and several words in English that he did not have prior the study period.
17. Yoder, P., & Stone, W. (2006). Randomized comparison of two communication interventions for preschoolers with autism spectrum disorders. *Journal of Consulting and Clinical Psychology, 74*, 426-435. This study compared the efficacy of Responsive Education and Prelinguistic Milieu Teaching (RPMT) and PECS in 36 preschoolers with autism. Results demonstrated that the RPMT facilitated more generalized turn taking and initiation of joint attention than the PECS. However, the PECS facilitated more generalized requests than the RPMT in children with very little initiating joint attention prior to treatment.

18. Malandraki, G., & Okalidou, A. (2007). The application of PECS in a deaf child with autism: A case study. *Focus on Autism and Other Developmental Disabilities, 22*, 23-34.
This study involved the use of PECS to develop functional communications skills in one 10-year-old boy with autism and profound hearing loss. Over the four-month study period, the participant learned to use PECS to communicate spontaneously and also developed prosocial skills that were not targeted in this study.
19. Marckel, J., Neef, N., & Ferreri, S. (2006). A preliminary analysis of teaching improvisation with the Picture Exchange Communication System to children with autism. *Journal of Applied Behavior Analysis, 3*, 109-115.
This study attempted to teach two young boys (ages 4 and 5) with autism to improvise their use of PECS to request items for which pictures were not available. The task was to use descriptors such as functions, colors, or shapes to request the unavailable item. Over the study period of 40 sessions, both children were able to successfully improvise with PECS to request the desired items.

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- Yoder, P., & Stone, W. (2006). Randomized comparison of two communication interventions for preschoolers with autism spectrum disorders. *Journal of Consulting and Clinical Psychology, 74*, 426-435.

RESOURCES AND MATERIALS

- Autism Internet Modules: Picture Exchange Communication Systems:
<http://www.autisminternetmodules.org/>
- Autism Web Course: Picture Exchange Communication Systems Module:
http://cdd.unm.edu/swan/autism_course/modules/comm/pecs/index.htm
- Indiana Resource Center for Autism: <http://www.iidc.indiana.edu/index.php?pageId=525>
This article describes the foundation of PECS.
- National Professional Development Center on Autism Spectrum Disorders. Evidence-Based Practices Briefs: Picture Exchange Communication Systems:
<http://autismpdc.fpg.unc.edu/content/picture-exchange-communication-system-pecs>
- Picture Exchange Communication System:
<http://www.asatonline.org/intervention/treatments/picture.htm>
This Association for Science in Autism Treatment fact sheet gives a concise explanation of PECS.
- Picture Exchange Communication System: <http://www.polyxo.com/visualsupport/pecs.html>
Written from personal experience, this webpage gives an in-depth understanding of the phases of PECS.
- Pyramid Educational Systems: <http://www.pecs.com/>
This is the official website for the PECS and as such it offers multiple resources, including up-to-date research and applications.

GENERAL RESOURCES

- Autism Internet Modules (AIM) www.autisminternetmodules.org. The Autism Internet Modules were developed with one aim in mind: to make comprehensive, up-to-date, and usable information on autism accessible and applicable to educators, other professionals, and families who support individuals with autism spectrum disorders (ASD). Written by experts from across the U.S., all online modules are free, and are designed to promote understanding of, respect for, and equality of persons with ASD.
- The Autism Web Course: http://cdd.unm.edu/swan/autism_course/about/index.htm. This web course was developed out of materials from the Interactive Collaborative Autism Network (ICAN). The Autism Programs at the University of New Mexico has updated and added information to this web course.
 - Characteristics
 - Assessment
 - Academic Interventions
 - Behavioral Interventions
 - Communication Interventions

- Environmental Interventions
- Social Interventions
- Family Support Suggestions

- Indiana Resource Center for Autism (IRCA)
<http://www.iidc.indiana.edu/irca/fmain1.html>. The Indiana Resource Center for Autism staff's efforts are focused on providing communities, organizations, agencies, and families with the knowledge and skills to support children and adults in typical early intervention, school, community, work, and home settings.
 - IRCA Articles: <http://www.iidc.indiana.edu/index.php?pageId=273>

- Texas Statewide Leadership for Autism www.txautism.net. The Texas Statewide Leadership for Autism in conjunction with the network of Texas Education Service center with a grant from the Texas Education Agency has developed a series of free online courses in autism. Please check the training page, www.txautism.net/training.html, for update lists of courses, course numbers and registration information. Current courses include the following:
 - Asperger Syndrome 101
 - Augmentative and Alternative Communication and the Autism Spectrum
 - Autism for the General Education Teacher
 - Autism 101: Top Ten Pieces to the Puzzle
 - Classroom Organization: The Power of Structure for Individuals with ASD
 - Communication: The Power of Communication for Individuals with ASD
 - Futures Planning for Students with Autism Spectrum Disorder
 - Navigating the Social Maze: Supports and Interventions for Individuals with ASD
 - Solving the Behavior Puzzle: Making Connections for Individuals with ASD