
Abstract: This study examined the acquisition of a mand repertoire by one child with pervasive developmental disorder and ADHD. The subject was taught to request preferred items using American Sign Language (a topography based response form) and the Picture Exchange Communication System (a selection-based form). There were four types of sessions: (1) training session for PECS, (2) training session for sign language, (3) test for generalization of the PECS words, and (4) test for generalization for the sign words. The number of trials to meet criterion and the occurrence of spontaneous emissions of the taught words was recorded. Also, the same word was taught for five days in both the PECS and the sign session and the results were recorded. It was found that the selection-based verbal response technique (PECS) was more effective in all areas. This finding contradicts the results of previous studies, suggesting that further research is needed. (http://www.behavior-analyst-online.org/NEWBAT/Frameless%20BAT/BATissues.html)


Abstract: The Picture Exchange Communication System (PECS) is an augmentative /alternative communication strategy for those who display little or no speech. The rationale for PECS and its training sequence is described. Each phase of training is associated with specific behavior analytic teaching strategies. Skinner’s analysis of Verbal Behavior forms the basis for teaching particular skills at specific points in the training sequence and also provide guidelines for how best to design the teaching strategies. Common problems and potential solutions are offered for various levels of training. The relationship between PECS and the co-development of speech, as well as its impact upon other behaviors (e.g., behavior management concerns, social orientation, etc.) is briefly reviewed. (http://www.behavior-analyst-online.org/NEWBAT/Frameless%20BAT/BATissues.html)


Abstract: A variety of strategies have been used to help children with autism acquire functional communication skills. The Picture Exchange Communication System (PECS) is a unique communication training program that was developed as a means of circumventing some shortcomings associated with these strategies. A description of the steps within PECS is provided. Long-term group data have indicated that a large proportion of children started on PECS as preschoolers acquire speech. Individual and group data supporting the use of PECS are provided. (http://www.proedinc.com/focus.html)
Abstract: The Picture Exchange Communication System (PECS) was developed as a means to teach children with autism and related developmental disabilities a rapidly acquired, self-initiating, functional communication system. Its theoretical roots combine principles from applied behavior analysis and guidelines established within the field of alternative and augmentative communication. This approach has several potential advantages relative to imitation-based strategies (both vocal and gestural) and symbol selection strategies. The system begins with the exchange of simple icons but rapidly builds “sentence” structure. The system also emphasizes developing the request function prior to developing responding to simple questions and commenting. The development of requesting with a sentence structure also permits the rapid development of attributes more traditionally taught within a receptive mode. The relationship between the introduction of PECS and various other behavioral issues (i.e., social approach and behavior management) as well as its relationship to the codevelopment of speech are reviewed.

Abstract: 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 non-vocal students is reviewed.


Abstract: This paper presents Skinner’s (1957) analysis of verbal behavior as a framework for understanding language acquisition in children with autism. We describe Skinner’s analysis of pure and impure verbal operants, and illustrate how this analysis may be applied to designing communication training programs. The Picture Exchange Communication System (PECS) is a training program influenced by Skinner’s framework. We describe the training sequence associated with PECS, and illustrate how this sequence may establish multiply
controlled verbal behavior in children with autism. We conclude with an
examination of how Skinner’s framework may apply to other communication
modalities and training strategies.  

Chambers, M. & Rehfeldt, R. (2003). Assessing the acquisition and generalization of
two mand forms with adults with severe developmental disabilities. Research in

Abstract: The purpose of this study was to determine whether manual sign or the
Picture Exchange Communication System (P.E.C.S.) (Frost and Bondy, 1994)
would be more effective in teaching mand skills to adults with mental
retardation in the severe and profound range. Four participants were taught to
mand for four reinforcing items using both communication modalities, in an
alternating treatments design. Three of four participants demonstrated criterion
performance across all four mands using P.E.C.S. first. Two of those three
participants later demonstrated criterion performance for the mands using
manual sign. The fourth participant was removed from the study during training
due to illness, but her progress indicated greater acquisition with P.E.C.S.
Generalization probes conducted at participants' respective residences showed
that three participants demonstrated generalization across settings using
P.E.C.S., and two participants demonstrated generalization across settings using
manual sign. Participants were also more likely to mand for reinforcing items
not present using P.E.C.S. than using manual sign.  

the Picture Exchange Communication System (PECS) with children with autism:
Assessment of PECS acquisition, speech, social-communicative behavior, and

Abstract: The picture exchange communication system (PECS) is an augmentative
communication system frequently used with children with autism (Bondy &
Frost, 1994; Siegel, 2000; Yamall, 2000). Despite its common clinical use, no
well-controlled empirical investigations have been conducted to test the
effectiveness of PECS. Using a multiple baseline design, the present study
examined the acquisition of PECS with 3 children with autism. In addition, the
study examined the effects of PECS training on the emergence of speech in play
and academic settings. Ancillary measures of social-communicative behaviors
and problem behaviors were recorded. Results indicated that all 3 children met
the learning criterion for PECS and showed concomitant increases in verbal
speech. Ancillary gains were associated with increases in social-communicative
behaviors and decreases in problem behaviors. The results are discussed in terms
of the provision of empirical support for PECS as well as the concomitant
positive side effects of its use.  

Frea, W., Arnold, C. & Vittimberga, G. (2001). A demonstration of the effects of
augmentative communication on the extreme aggressive behavior of a child with
autism within an integrated preschool setting. Journal of Positive Behavior
Intervention, 3, 194-198.

Abstract: Abstract: Research in the area of behavior support has repeatedly
demonstrated the positive effects of learning more effective and efficient
communication on the challenging behaviors of individuals with developmental disabilities. More recently, augmentative and alternative communication strategies have been receiving increased attention as primary teaching goals for young children with autism. Use of picture exchange and choice-making opportunities has been reported to facilitate speech acquisition and/or result in increased communicative attempts across daily routines. The case study discussed in this article examines the effects of picture exchange on the severe aggressive behavior of a preschooler with autism who was at risk of losing his integrated school placement. Picture exchange was introduced within two play routines in the classroom. The effects of picture exchange on the student's aggression were evaluated within a multiple baseline design. Results indicated that the student's aggressive behavior was eliminated in a brief amount of time when picture exchanges were in place. These findings are discussed in terms of integrating augmentative communication into behavioral support planning and future research in this area. (http://www.proedinc.com/jpbi.html)


Abstract: Few studies on augmentative and alternative communication (AAC) systems have addressed the potential for such systems to impact word utterances in children with autism spectrum disorders (ASD). The Picture Exchange Communication System (PECS) is an AAC system designed specifically to minimize difficulties with communication skills experienced by individuals with ASD. The current study examined the role of PECS in improving the number of words spoken, increasing the complexity and length of phrases, and decreasing the non-word vocalizations of three young children with ASD and developmental delays (DD) with related characteristics. Participants were taught Phases 1–4 of PECS (i.e., picture exchange, increased distance, picture discrimination, and sentence construction). The results indicated that PECS was mastered rapidly by the participants and word utterances increased in number of words and complexity of grammar. (http://www.springerlink.com/)


Abstract: The Picture Exchange Communication System (PECS TM) aims to teach individual users to initiate communication. The effectiveness of introducing this approach to whole classes within a school for autistic spectrum disordered children was investigated in two groups. Class staff and parents attended a formal PECS training course and the impact on the amount, functions and method of communication and the level of adult support required were recorded. Observations were carried out in four different contexts: free play, snack, swimming and structured teaching. For group 1 children, aged 6 to 8, the
amount of communication increased in all activities apart from swimming. Requesting was the most frequent function at both base-line and follow-up. The most frequently used method of communication at base-line was by symbols. At follow-up symbols was the main method for snack and structured teaching and physical communication was predominant for free-play and swimming. The presence of an object/event was the main level of stimulus to which children responded for all activities. For Group 2 children, aged 9-10 years, total communicative acts increased for all activities apart from structured teaching, where the decrease may have been due to their being taught more independent skills of commenting for the first time. Requesting remained the most frequent function of communication, and more formal means of communication were observed. The presence of an object/event remained the main stimulus for snack and swimming, but more independent responses were seen in free-play, with the presence of a listener becoming the level of cue required to initiate communication. At follow-up, children involved in the study appeared to show less frustration, were able to accept that their requests might not always be met, and could wait patiently for adult attention. (http://www.speechmag.com/)


Abstract: Communication and interactions with others are a few of the hardest tasks for an autistic child. This study showed how the gap may be bridged by using a system called the Picture Exchange Communication System (PECS). A 6-year-old girl named Molly showed much improvement in both her verbalizations and socialization skills using this method which gives promise to execution of these programs. (http://www.kluweronline.com/issn/0162-3257/contents)


Abstract: PECS was developed in Delaware, USA over 10 years ago by Bondy and Frost (1994a). Over the last two years PECS has been introduced to this country and has raised a great deal of interest in people working in the field of autistic spectrum disorders (ASD). This paper will address some of the issues that arose during the establishment of PECS in one special school. Changes seen in 21 children with severe learning difficulties who have been taught to use PECS are reported and the use of PECS with children who do not have an ASD is discussed. (http://www.tandf.co.uk/journals/titles/13682822.asp)


Abstract: A pilot study was conducted to evaluate the effects of training teachers of children with autistic spectrum disorders (ASDs) in the use of the Picture Exchange Communication System (PECS). Thirty-four children with ASDs (29 boys and 5 girls) were selected from eight specialist schools. Teaching staff attended a 2 day PECS workshop and received six half-day visits from PECS consultants. Data on the children's use of PECS, spontaneous communication,
and adaptive behaviour were collected before the study and at set times following the workshop. Significant, rapid increases were recorded in the level of PECS attained by the children, in their PECS vocabulary, and in their frequency of PECS use over time. Improvements in children's general level of communication were slower to occur. The majority of participants showed improvements in their ability to use PECS. The results are discussed in relation to the methodological and practical difficulties that arose during the project. (Journal website: http://www.sagepub.co.uk/journal.aspx?pid=105478&sc=1)


Rehfeldt, R.A., & Root, S. L. (in press). Establishing derived requesting skills in adults with severe developmental disabilities. *Journal of Applied Behavior Analysis*. Abstract: This project examined whether a history of reinforced relational responding would result in derived requesting skills in three adults with disabilities. Participants were first taught to request preferred items using pictures [with PECS]; they were then taught conditional discriminations between pictures and their dictated names and dictated names and their corresponding text. Finally, requests for preferred items using corresponding text were evaluated. All three participants demonstrated derived requesting skills. (http://seab.envmed.rochester.edu/jaba/)

Schwartz, I. S., Garfinkle, A. N., & Bauer, J. (1998). Communicative outcomes for young children with disabilities. *Topics in Early Childhood Special Education, 18*, 144–159. Abstract: The Picture Exchange Communication System (PECS) has become a widely known and used augmentative system for teaching functional communication skills and potentially providing a bridge to speech acquisition. Unfortunately, although there is a great deal of anecdotal clinical evidence about the PECS, there is little empirical information about its efficacy. We present two studies documenting the use of PECS for preschool children with severe disabilities. The first study analyzed the PECS acquisition data for 31 preschool children and demonstrated that young children with severe communication delays and disorders can learn to use PECS quickly and efficiently. The second study followed 18 preschool PECS users for a year. The results of language samples taken at snack time and during free-choice activities indicated that PECS use generalizes to untrained settings and may have concomitant effects on untrained language functions. Directions for future research are discussed. (http://www.proedinc.com/tec.html)

Abstract: A 6-month follow-up of an individual reported to engage in validated facilitated communication (FC) is presented. Three main issues are addressed: the current status of the individual's FC use, the effect of food reinforcers on his communicative ability, and a comparison of FC to the Picture Exchange Communication System (PECS). Results indicated that the individual did not engage in any validated FC, that performance was equivalent on food and nonfood trials, and that PECS was the preferred mode of communication, yielding 100% accuracy in a message-passing, object identification task. Implications of these findings are discussed in the context of an individual's right to communicate by objectively validated methods. (http://www.kluweronline.com/issn/0162-3257/contents)


Abstract: This study compared the effects of Picture Exchange Communication System (PECS) and sign language training on the acquisition of mands (requests for preferred items) of students with autism. The study also examined the differential effects of each modality on students' acquisition of vocal behavior. Participants were two elementary school students with autism enrolled in a suburban public school. Training sessions involved presentations of preferred items, prompting and prompt fading procedures. Probes were conducted to evaluate the generalization of learned mands to classroom teachers. For one participant, sign language training produced a higher percentage of independent mands. PECS training produced a higher percentage of independent mands for the other participant. For both participants, sign language training produced a higher percentage of vocalizations during training. Mands learned with the experimenter generalized to classroom teachers. The results of the study suggest that acquisition of picture exchange and sign language may vary as a function of individual student characteristics, specifically, motor imitation skills prior to intervention. However, further research is needed to determine the optimal procedures for teaching both modalities to students with communication difficulties. (http://www.proedinc.com/focus.html)


Abstract: The author who is a teacher at Avalon Special School, Street, Somerset, introduced PECS to a class of 6, 4/5 year old children, with severe communication difficulties, and of whom 5 have autistic spectrum disorders. The work started mid-September 1998 and within weeks all children who were previously at a pre-verbal level, were verbalising, and now five months on are using spoken language to communicate spontaneously with and without the use of symbols/words.


Abstract: This paper reports one of the first studies to be conducted in the UK on the impact of PECS on children with an autism spectrum disorder and severe
learning difficulties. Teresa Webb is a teacher at a special school for children with severe and multiple learning difficulties. In September 1998, she introduced PECS to a class of six children aged between 4 and 6 years. All, but one, had an ASD and all had severe communication difficulties. In her opinion, PECS has had a major effect on the children’s skills and behaviour and has also influenced how staff work. The parents too report big improvements in their child’s communication skills and visitors to the school have been impressed by what they see. Clearly, the conclusions that can be drawn from the study are limited in that there was no comparison group of children who did not receive PECS or who were engaged in a different intervention and so further research is required. http://www.corelearning.co.uk/gap/index.asp

Abstract: This article reviews the progress of a group of children 19 months after being introduced to PECS which was reported in Special Children 1999. The group have progressed from using 3-5 word sentences incorporating attributes to spontaneously requesting and commenting both with and without PECS. As speech developed the teacher continued to use PECS as a framework for teaching further communicative functions and a range of curriculum subjects. The familiar framework enabled the assimilation of new concepts and ideas more easily, and they were able to ask and respond to a range of questions. They progressed to more advanced requesting and commenting lessons and used the conjunction ‘and’ and the indefinite article ‘a’ within 13 word sentences. There was increasing evidence of generalisation as the taught structures were used spontaneously at home, which underlines the importance of ensuring the same vocabulary is available in all environments. Gradually, the children were observed using commenting spontaneously both with and without PECS, and the skill extended into narrative and description. The author used PECS right across the day, which enabled language to be integrated with the social and environmental context and enabled the mapping of language onto experiences. The development of functional communication impacted on reducing contextually inappropriate behaviours. In fact it also raised the question of whose behaviour changed the most, the children’s or the staff? Staff found that by using PECS they could eliminate prompts, allow time to observe, facilitate children to respond and self-correct, and as a result peer interaction and independence was able to develop.

See also:
Abstract: Many individuals with autism are candidates for augmentative and alternative communication (AAC) systems, either to supplement (i.e., augment) their existing speech or to act as their primary (i.e., alternative) method of expressive communication. The purpose of this article is to summarize research and directions for future research with regard to two questions related to the delivery of AAC supports to these individuals: (a) What AAC modality is
preferable to use? and (b) What do we know about the use of voice output communication aids with people with autism? (http://www.asha.org)