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Efficacy of the Picture Exchange Communication Systemin Children with Autism Spectrum Disorder

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Introduction

Autism Spectrum Disorder (ASD) is a neurological and developmental disorder that begins in early childhood and persists throughout a person's life. ASD is characterized by persistent deficits in social communication and social interaction and restricted, repetitive patterns of behavior, interests, or activities. ASD is a spectrum disorder because symptoms can vary from one individual to another, range from mild to severe, and change as the child develops. Many families are affected by the disorder and must assess the best treatment options available for their child, ranging from behavioral, speech, language, social, and occupational therapies. This project will focus on the social communication deficits of these children and the language interventions available to help improve these skills in children with ASD.

While symptomology in each child may vary, most children with ASD have some type of social communication impairment. Research targeting the most efficient interventions is beneficial for families to optimize their child's social communication abilities. The Picture Exchange Communication System (PECS) is a picture-based augmentative and alternative communication (AAC) designed to aid communication in non-verbal children with ASD. Research has shown that PECS has led to increases in social-communicative skills as well as functional language in children with ASD. Other language interventions and therapies have also been shown to improve these skills.

The question proposed in this project is whether PECS is superior to other language interventions at improving these skills in children with ASD. Families of children with ASD must assess and begin implementing their treatment options quickly because early intervention is crucial to the development of the child. Therefore, the importance of this research is to establish which language interventions are the most effective at improving social communication and language so that families have information on the best options available.

Hypothesis

If a child diagnosed with Autism Spectrum Disorder (ASD) uses the Picture Exchange Communication System, then the child will have better social communication skills and functional language than a child diagnosed with ASD who uses conventional language interventions.

Key Definitions

Independent variables

Autism Spectrum Disorder: a neurological and developmental disorder characterized by persistent deficits in social communication and social interaction and restricted, repetitive patterns of behavior, interests, or activities.

The Picture Exchange Communication System: a picture based AAC that uses behavioral principles to teach children with ASD to use functional communication in a social interaction context.

Conventional language interventions: ASD interventions that focus attention on helping children with ASD acquire language, including augmentative and alternative communication.

Dependent variables

Social-communication skills: include spontaneously seeking out a communication partner and initiating communication, initiating requests, responding to questions, making social comments, initiating joint attention, generalized turn taking, cooperative play, and any social communication.

Functional language: any speech or spoken language, word approximations, verbalizations, imitated verbalization and any related speech, words spoken or uttered, intentional communicative acts (ICA), mean length of verbal utterances (MLU) and any verbal communication.

Table Note

AAC= Augmentative and Alternative Communication; ASD= Autism Spectrum Disorder; CLT= Conventional Language Therapy; ESCS-Abridged = The Early Social Communication Scales-Abridged; PDD = Pervasive Developmental Disorder; PDD-NOS = Pervasive Developmental Disorder – Not Otherwise Specified; PECS= Picture Exchange Communication System; RPMT: Responsive Education and Prelinguistic Milieu Teaching; SGD = Speech-Generating Device; UFPE = Unstructured Free Play with Examiner; VABS= Vineland Adaptive Behavior Scale; VOCA = Voice Output Communication Aide

Results

Study/ Relation to Hypothesis	Sample Size	Age(s)	Sample Type	Intervention Type	Assessment Instruments and Dependent Variables	Results
Lerna et al. (2012) Support	18	18-60 month age range	Children with autism and little functional language	PECS or CLT	VABS; Observation of cooperative play, eye contact, joint attention, requests, and initiation	PECS improved social-communicative skills more than CLT on the communication and social domains
Yoder & Lieberman (2010) Support	36	18-60 month age range	Children with autism or PDD and little functional language	PECS or RPMT	ESCS-Abridged; Measured social-communication skills and picture exchanges	PECS increased the number of picture exchanges more than RPMT
Ganz & Simpson, (2004) Support	3	Ages 3, 5, and 7 years	Children with autism, no functional speech, and no prior use of PECS	PECS	Observation of intelligible words spoken and presence of non-word vocalizations	PECS increased use of intelligible words spoken from baseline measurement
Cannella-Malone et al. (2010) Support	2	Ages 6 and 14 years	One child with autism and one teen diagnosed with PDD-NOS	PECS with Peers Protocol	Observation of greetings, requests, and responses	PECS increased greetings and requests from baseline measurement
Beck et al. (2008)f Refute	4	Preschool age	Preschool children with autism, limited verbal abilities, and no prior use of AAC	PECS or VOCA	Observation of verbalizations and vocalizations	PECS and VOCA varied on verbalizations; there was no difference in efficacy of PECS and VOCA
Boesch et al. (2013) Refute	3	Ages 6, 7, and 10 years	Children with autism, limited communication skills, and no current use of speech-output technology	PECS or SGD	Observation of requests	PECS and SGD increased requesting skills and SGD was more effective in two participants; no significant differences were found between intervention conditions
Tincani (2004) Mixed	2	Ages 5 and 6 years	Children with ASD and inability to use functional speech	PECS or sign language training	Observation of motor imitation, mands, and word vocalizations	PECS produced higher percentage of mands when the participant had weak imitation skills prior to treatment and sign language training produced higher mands when the participant had moderate imitation skills prior to treatment. Sign language produce higher percentage of vocalizations in both participants
Yoder & Stone (2006) Mixed	36	18-60 month age range	Children with diagnosis of autistic disorder and minimal verbal language	PECS or RPMT	ESCS-Abridged and UFPE measured joint attention, frequency of requests, and frequency of object exchange turns	RPMT increased object exchange turns more than PECS. Children with higher joint attention benefitted more from RPMT and children with little to no joint attention benefitted more from PECS

Discussion and Conclusions

The supporting articles provide evidence that PECS was effective in improving social communication skills and language in children compared to other language interventions. Refuting articles provide evidence that PECS did not significantly improve social communication skills or language compared to other language interventions and therapies. Mixed articles provide evidence that there may be skills that a child might possess prior to intervention that will increase the probability that the child will improve social communication skills or language.

Overall, the thesis hypothesis was supported. A child diagnosed with ASD who uses PECS will experience improvements in social communication skills and functional language that are greater than experienced using other interventions. However, the effectiveness of PECS is modulated by the child's current functioning. The possession of certain skills prior to treatment can increase the effectiveness of PECS. For example, children with weak imitation skills and little joint attention prior to intervention benefitted more from PECS. Even in the refuting evidence, however, PECS was never associated with a decrease in social communication skills or language.

The ecological impact of these findings involves providing clinicians and mental health professionals with information to assist families of children with ASD in choosing the most efficient intervention option to help improve their child's social communication skills and language abilities. The translational impact of these findings are an increase in learning and socialization in children affected by ASD. Without functional language, children will have a difficult time learning and progressing in school. Inclusion especially important for children with ASD, therefore identifying the interventions that will improve social communication skills can help facilitate socialization in children with ASD.

Future Study

A definitive study that would provide support for the thesis hypothesis would include a comparison between PECS and another AAC, such as SGD or VOCA. The study would examine the effects of these AAC on social communication skills and language development. Participants in the study should include children diagnosed with ASD who fall on various ends of the spectrum in terms of symptomology. Prior to intervention, children should be assessed on functional language ability and various skills, such as joint attention, imitation, and requesting. Ideally, children that possess similar language and social-communication skills would be assigned to groups labeled as low functioning, moderate functioning, and high functioning, with the lowest functioning children possessing the lowest level of language and skills. This would provide a more accurate investigation of the efficacy of PECS and another AAC on children with similar symptomology.

The difficulty in conducting such a study is finding a large sample size of children diagnosed with ASD with similar symptomologies. Even children with ASD who are classified as high functioning may possess different verbal abilities or social skills, making it difficult to assess the effects of an intervention. Studies on ASD often do not include a large sample size, so it is likely that participants will differ greatly in their abilities. Another difficulty with these studies is the differences in acquisition of the AAC. Children may differ in their ability to master acquisition of the device,

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Key References

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