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## **USING BIMODAL COMMUNICATION METHOD WITH CHILDREN WITH AUTISM**

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### **ABSTRACT**

This paper focuses on using bimodal communication methods with children affected by Autism. Such children frequently show difficulties in language and communication, with relative strengths in visual and perceptual areas.

The study reported here was conducted as follows: Participants (12 boys), aged between four and six, had been involved in a special-need program for at least six months before. All of them were encouraged to learn to communicate nine single requests: three via 'Picture Exchange Communication System' (PECS), three via Manual Signs (MS), and three via bimodal method (PECS + MS). The three treatments (PECS, MS and bimodal) were administered successively over three phases: 1) the initial learning session (for ten days), 2) the second learning session (for twenty days after the initial session), and 3) a follow-up learning session, held two weeks after the second session. All participants learned the exact requests (via different methods) and participated in all the treatments.

This paper was inspired by a paper by Foreman and Crews (1998).

**Keywords:** Picture Exchange Communication System, Manual Signs, Autism, Augmentative and Alternative Communication, Bimodal Communication.

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### **1. INTRODUCTION**

Autism is a complex brain disorder resulting in social, behavioural and language problems. First described in 1943 (Kanner, 1943), it is characterized by impairments in language and nonverbal communication,

deficits in social interaction, and restricted, repetitive, and stereotyped patterns of behaviour, interest, and activities.

Much evidence supports the idea that genetic factors (that is, genes, their functions, and their interactions) are one of the leading causes underlying Autism. However, researchers are looking for more than one gene. The current state of knowledge suggests that 20 or more genes on different chromosomes may be involved in Autism to different degrees. Some genes may place a person in autism-susceptibility loci. Other genes may cause specific symptoms or determine how severe those symptoms are. Alternatively, genes with mutations may add other signs to the symptoms of autism because these genes, or gene products, are not working properly.

The communication problems of autism vary depending on the intellectual and social development of the individual. Some individuals may be unable to speak, whereas others may have rich vocabularies and can talk about topics of interest in detail. Despite this variety, many individuals with autism have little or no problems with pronunciation. Many have problems with the meaning of words and sentences, intonation, and rhythm. Many of them have a real difficulty in using the language (Guazzo, 2024).

Non-speaking children may use Augmentative and Alternative Communication (AAC) during their early development to augment natural speech to communicate and develop language skills (Guazzo, 2021).

### **1.1. Augmentative and Alternative Communication**

AAC is a communication strategy that uses symbolic (e.g., speech or spoken words, manual signs, arbitrary visual-graphic symbols, printed words), iconic (e.g., actual objects, photographs, fine drawings, pictographic symbols), non-symbolic (e.g., signals such as crying or physical movements), mechanical and electronic (e.g., Communication boards, Concrete objects, Computers) systems that provide communicative access to people with cerebral and physical disabilities (Mineo Mollica, 2003; Sevcik, Romski & Wilkinson, 1991).

Ideally, an AAC system includes multiple modes of communication; the child uses whichever is the most efficient given the persons, the setting, and the activity at hand (Romski & Sevcik, 2005; Arthur, 1989; Berry, 1987).

There are two types of AAC techniques: unaided and aided communication. Unaided forms of communication do not require any equipment that is external to the body. They involve using symbols such as manual signs, gestures, facial expressions, etc. Aided forms of communication incorporate devices external to the individuals who use them. They involve using symbols such as photographs, line drawings, pictures, printed words, and graphic symbols (including Picture Communication Symbols – PCS and Blissymbols), which may be organised into charts or books. Most people with autism use a combination of unaided and aided communication forms, depending on the context, individual skills, and communication partners (Beukelman & Mirenda, 2005). AAC can play the following four different roles, depending on the child's needs (Romski & Sevcik, 2005: 1) augmenting existing natural speech, 2)

providing a primary communication output, 3) fostering the development of early language skills, and 4) serving as a language enhancement strategy.

This work will use PECS (Picture Exchange Communication System) and Manual Signs (MS).

Normally, programs involving systems in which one must point to images teach naming as the first communicative function; however, this is not the most appropriate communicative function to be taught first to individuals with autism since it does not incorporate natural reinforcers: naming is maintained by extrinsic (edible or social) reinforcers. Instead, the first skill to be taught should be “making requests” since natural reinforcers maintain this skill: children learn to obtain a desired object by handing an adult the picture representing it (PECS) or by performing a hand gesture (MS) immediately receiving what they want.

The PECS consists of six steps. It begins by teaching the learner to deliver a single picture to a ‘communicative partner’, then moves on to teaching the learner to discriminate pictures from one another and combine them to structure increasingly complex and structured sentences (Bondy & Frost, 2011; Charlop-Christy, Carpenter, Le, LeBlanc & Kellet, 2002).

Manual Signs consist of a combination of hand gestures, even uncoded ones, that allow the learner to express a request, give an answer or establish an interaction with the interlocutor (Holmer, Heimann & Rudner, 2016).

This work was inspired by a paper by Foreman and Crews (1998).

## **2. METHOD**

All children who participated were encouraged to learn to communicate nine single “requests”: three via a PECS (i.e., exchange an image [PCS] for what the learner wants), three via a Manual Sign (i.e., touch the palm of the left hand with the index finger of the right hand.), and three via a bimodal method (i.e., PECS + MS). The three treatments (PECS, MS and bimodal) were administered successively during the learning tasks. All participants learnt the exact requests (via different methods) and participated in all the treatments (Foreman & Crews, 1998; Iacono, Mirenda & Beukelman, 1993; Brady & Smouse, 1978).

The learning tasks were divided into three separate phases: 1) the initial learning session (for ten days), 2) the second learning session (for twenty days after the initial session), and 3) a follow-up learning session held two weeks after the second session (Bahrack, 1967; Nelson, 1978).

## **3. PARTICIPANTS**

Participants were 12 Italian children (all boys), aged between four and six, with level-2 autism. They were no-speaking children, able to use essentially motor and behavioural communication. They had been involved in a special-need program for at least six months. All participants were instructed and tested in a structured environment at the rehabilitation centre and at home with international protocol. The materials used were part of the children’s daily lives.

#### 4. PROCEDURE

All participants were shown how to make the exact nine “requests” satisfying some of their needs. The requests were ‘drink a juice box’, ‘eat a cookie’, ‘play with bubbles’, ‘take a walk’, ‘ride a car’, ‘ride a swing’, ‘ride a bicycle’, ‘play at bowling’, and ‘watch a movie’. The requests were represented by simple pictures (e.g., the ‘eat a cookie’ request was represented by a single cookie) or gestures that the child, based on his motor skills, could reproduce (e.g., the cookie request was made by pointing the index finger of the right hand at the palm of the left hand). Each of the three treatments was employed in each of the three learning sessions: the initial learning session, lasting ten days, was aimed at fulfilling one of his desires (e.g., playing with bubbles); the second learning session, lasting twenty days after the initial session, was aimed at answering questions such as, “What do you want?”; the third follow-up session was conducted two weeks after the second session.

The second and third sessions included a maximum of five practice tests, in which children made a “request” appropriately: that is, a child received a score of three when asked, “What do you want?” and/or “What do you want to do?” he or she used a “communication method” (e.g., PECS or MS) appropriately, within 30 seconds, without receiving help; if, on the other hand, the child needed a ‘model’ to communicate a request, he or she was awarded two points, while he or she was awarded only one point if the model had to perform three 30-second trials before the child was able to do so on his or her own. If the child did not use any method of communication after the training, he was not awarded any points.

#### 5. RESULTS

Statistical analysis involved a 3 x 3 ANCOVA (three Session levels - first, second, and follow-up - by 3 Method levels: PECS, MS and bimodal. The effects of the methods were further investigated using a univariate F-test. Scores obtained for the PECS and the bimodal methods had significantly higher scores than the MS method [respectively:  $F = 7.971$ ,  $p = .01$ , and  $F = .597$ ,  $p = .501$ ]. The superiority of PECS and Bimodal methods over the MS method, found in the F-test, was also supported by the one-sample t-tests:  $t = 0.31$ ,  $p = .73$ ,  $t = 0.69$ ,  $p = .50$ , and  $t = 0.87$ ,  $p = .91$ .

#### CONCLUSIONS

The intervention with PECSs and MSs began with assessing potential reinforcers for each subject: thus, the objects or activities that all learners sought and required most frequently were selected. In the first phase, subjects were taught to take a single picture, place it in the operator's open hand, and thus exchange the picture for the specific object (for PECS) and configure the specific hand sign to request one of the identified objects or activities. Physical and gestural cues were used at this stage, but no verbal cues were provided to avoid dependence. Later, regarding PECS, when the subject took the figure, the operator gradually moved away from him, holding his hand open, so the child learned to take the figure and walk toward the operator to give it to him. Procedures consistent with the different forms of discrimination training presented in other works were used at this stage (Guazzo, 2021).

The results of this study support the use of a bimodal method to improve communication in children with autism. As the results showed, the simultaneous use of PECS and MS (i.e., the bimodal method) resulted, on average, in significantly higher scores for all children. This result is very interesting because in Italy, unlike other countries, 'Sign Language' is rarely used by the hearing impaired. Still, slang signs (configured ad hoc) are often used only in certain contexts (Rehabilitation Centre, family, etc.) and with certain interlocutors (Therapists, Family members, etc.), making communication difficult in other environments and with other people with whom it is possible, instead, to use PECS. The use of MS integrates perfectly with PECS if the object or activity that the subject would like to request is not present among the images to make the exchange, then the sign becomes a "social facilitator" that allows the subject to make the request anyway. Then, it can be concluded that including sign elements in a child's initial communication support system (PECS + MS = bimodal communication) improves his communicative performance and expands the possibility of interaction with others (Guazzo & Acampora, 2007).

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