

EFFECT OF VISUAL STRATEGIES ON DEVELOPMENT OF COMMUNICATION SKILLS IN CHILDREN WITH AUTISM

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ABSTRACT

Thirty children with autism from special education schools in Mumbai, participated in the experimental research that aimed to document the effect of visual strategy training on development of communication skills and compare its effectiveness with existing classroom instructions. Objects, pictures, symbols and manual signs were used as visual tools. The treatment group received 14 one-to-one sessions. Each session focused on development of comprehension, labeling, description, joint attention and active interaction through visual supports. Analysis of data showed a significant improvement in communication skills of children in the experimental group. Visual strategies were found to be effective in development of communication skills in children across the age range of 5 to 11 years.

INTRODUCTION

Communication is the basis of all human interaction. The ability to communicate and process communication varies from person-to-person. The more sophisticated this ability, the greater the learning capacity and vice versa. From the most primitive to the most modern society communication is seen as a vehicle for taking personal and social needs forward. Communication includes the spoken and written word, signal, sounds, gestures, signs, pictures, symbols, music and body language. Communication is a powerful tool, an eloquent weapon, a manipulative agent, a distinctive attribute and as recognisable for each individual as is appearance (1). Disordered communication can prevent a person from realising his or her potential. A communication disorder is an impairment in the ability to receive and/or process a symbol system; represent concepts of symbol systems; and/or transmit and use symbol system (2).

Autism is a developmental disability that affects essential behaviours such as social interaction, the ability to communicate ideas and feelings, imagination and the establishment of relationships with others (3). Some key symptoms of autism include failing to develop normal socialisation patterns, disturbances in speech, language and communication (4).

There is much heterogeneity in the communication characteristics of children with autism spectrum disorders (ASD). Language impairments in ASD may range from failure to develop any functional speech and language, to the development of functional but idiosyncratic use of spontaneous speech and language (5). For both verbal and non-verbal individuals, impairments in social and pragmatic aspects of language are the most salient (6). Hodgedon (7) mentions that one of the major areas of difficulty for children with autism, is the development of social and communication skills. Communication breakdown can lead to problems in social interaction, educational performance and behaviour. While it is common for educational programmes to focus on developing communication skills, often that focus, in many schools in India, tends to be on developing the child's expressive language. Comparatively little attention is directed towards increasing the child's ability to understand the communication in his or her life. Understanding the communication of others, trying to figure out what is happening or not happening, handling changes and transitions, and interpreting cues and signals in the environment can all be areas of difficulty in autism. Several studies have indicated that children with autism are visual learners (8,9,10). They are able to process visual information better than information that is purely in auditory form. This means that they understand what they 'see' better than they understand what they 'hear'. Hence, while most parents and educators would want the child with autism to communicate using the spoken form of language used in a given community, this may not be a feasible long term goal (11).

Visual tools and supports facilitate acquisition of communication skills in children with autism. Visual strategies are essentially use of such visual tools and supports, that are employed to enhance the communication process. Ranging from facial expression, body language, objects, pictures to posters and charts, visual tools promote effective receiving, processing, action and expression.

Since the information presented through visual tools is static and predictable, it enables the child with autism to rely on recognition rather than recall memory, to receive language input and generate language output (3). Picture schedules, labels, line drawings and other non-

transient visual cues are critical for helping children with autism to organise and know what to do in a given environment (7). In India, autism was an enigma till a decade ago. Children with ASD would be denied suitable intervention mainly because professionals by and large, were unaware of the unique nature and needs of autism. But things have changed considerably now. An increasing population of autistic people along with parent advocacy, has made a significant difference to intervention for autism in India. However, while the services have multiplied, ranging from early intervention at child development clinics, to placement in inclusive education class rooms, intervention and therapy have been central to all professional efforts. In their preoccupation with providing therapeutic intervention, many professionals do not ascertain the empirical evidence supporting the effectiveness of a given intervention strategy. This often results in teachers and therapists using or recommending intervention that do not have reliable research base.

Use of visual strategies has been reported to enhance play behaviour; reduce aggressive behaviour (12), enhance language acquisition (13,14) and improve communication (11). In this study, the authors used objects, manual signs, pictures and graphic symbols as visual strategies.

OBJECTIVES

The objectives of the study were:

- (i) To determine the effect of visual strategy training on development of communication skills in children with autism.
- (ii) To compare the development of communication skills of children with autism who received visual strategy training with those who did not.

METHOD

The study was conducted in Mumbai, a coastal city situated in the western part of India. An experimental research, it followed the pretest-post-test control group design.

Subjects

The sample of children with autism was randomly drawn from 3 schools in suburban Mumbai. The children within the age of 5-10 years, attended special classes. From the school records

the authors identified 38 children with autism, who belonged to the pre-selected age group. A total number of 30 children were randomly selected from the 38, and assigned to treatment and control groups, so that both groups had 15 children each.

Material

The Scale for Communication Skills (SCOMS), a measurement instrument was specifically developed for the study to measure acquisition of receptive and expressive language skills. SCOMS was sub-divided into three parts (1) General functioning skills (2) Receptive Language skills (3) Expressive Language skills.

- (1) General Functioning skills: This section comprised of those behaviours that are critical for development of communication. Behaviours such as making eye contact, sitting in one place, responding to sound, own name and greetings, were included here.
- (2) Receptive Language Skills: (a) Identification of objects of daily use (b) Following 2 word instructions and (c) Following simple sentences.
- (3) Expressive Language Skills : This section too, was sub-divided into (a) Labeling or naming objects of daily use, (b) Describing actions when pictures are shown and (c) Pragmatic use through maintenance of eye contact and joint attention during communication, and expressing choice when more options are presented, taking turns in conversation and so on.

SCOMS used the following patterns to record responses:

- (1) General functioning skills were recorded as 'yes/no' denoting either the presence or absence of a behaviour.
- (2) The receptive skills and expressive skills were measured on the scale of Correct Response (CR), Response with Visual Cue (RVC), Verbal Response (VR), Non- Verbal Response (NVR) and No Response (NR). The scale employed the recording procedure appropriate to each segment. Hence, receptive skills were recorded as CR, RVC and NR, and within expressive skills some behaviours were recorded as VR, NVR and NR, some on CR, RVC and NR. The scoring followed a 3, 2, 1 pattern in which a CR or a VR was scored as 3, a RVC or NVR received a score of 2 and NR was scored as 1. The assessment of general functioning skills was done after observation of the subject in his/her environment. The presence or absence of a functioning skill was scored as 1 and 0.

The instrument was content validated and subsequently pilot tested on 6 children with autism, who were similar to the children of the study in age and socio-cultural background. SCOMS was used as pre and post-test for this study.

Procedure

Communication level of each child was measured on SCOMS. The assessment was done in an environment familiar to the children and during their usual intervention time. Treatment consisted of communication skills training using visual tools and supports, such as objects, pictures, symbols and manual signs. The pretest scores were analysed to ensure parity among the children ($t = 1.58$, $df = 28$, $p > 0.05$). A selection of vocabulary, instructions and action words was made for this purpose. These selected words and instructions were similar to those in SCOMS. A set of pictures, and symbols cards were prepared. Similarly, sign match for the selected words was done using the Makaton Vocabulary (Indian version). The treatment delivered in one-to-one sessions, adopted the following elements.

- Exposure to an object (e.g. cup or shoe).
- Match object or its picture with its picture.
- Match object or picture / symbol with its appropriate sign.
- Point / Sign / Name object or picture or symbol when asked.

Each child in the treatment group received 14 individual teaching sessions. The duration of each session would be from 20 minutes to 30 minutes, depending on each individual child's capacity. Rewards and reinforcers were regularly used during the session for motivation. While treatment group children received communication training using visual strategies the control group continued with usual special classroom interventions. At the completion of the treatment session, children from both groups were tested again on SCOMS.

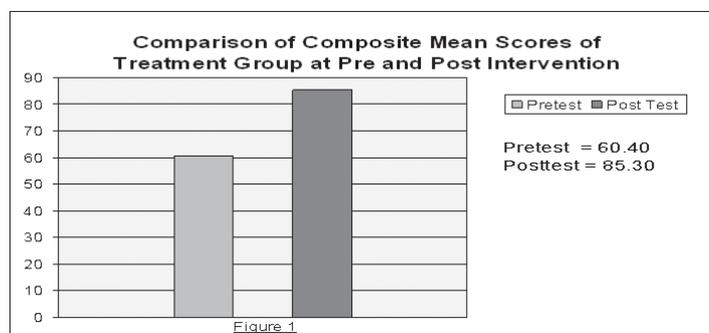
RESULTS

Visual strategies and development of communication skills

The first objective of the study was to determine the effect of visual strategies on the development of communication skills in children with autism. The treatment consisted of communication training through use of objects, pictures, symbols and manual signs. The

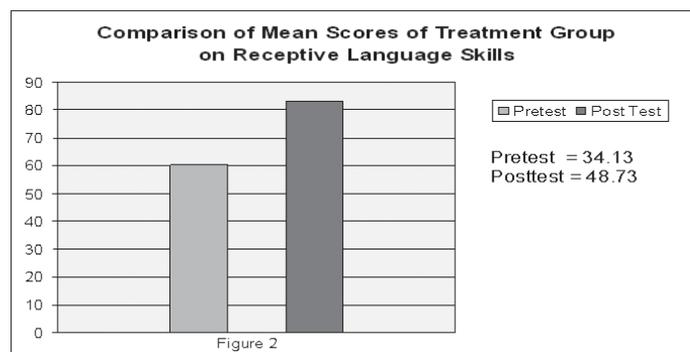
children's performance on communication skills was measured pre and post intervention. The composite mean score (60.40) attained by the children at the pre intervention phase was compared with that at post intervention (85.30). This difference was found to be statistically significant ($t = 7.06$, $df = 14$, $p < 0.01$). This indicates that use of visual strategies had a positive effect on development of communication skills in children with autism (Fig. 1).

Figure 1.



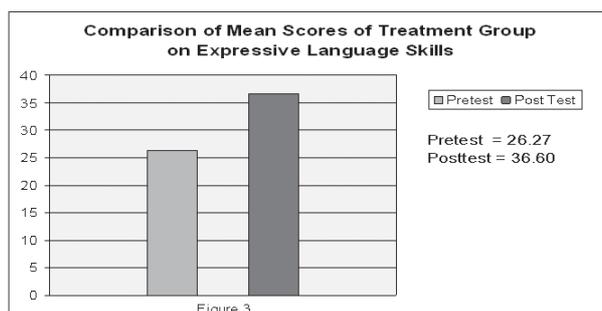
This effect was seen across the selected components (receptive and expressive aspects) of communication skills. The difference in mean scores on receptive language (Fig. 2) from pre (34.13) to post intervention (48.73) was significant statistically ($t = 6.81$, $p < 0.01$).

Figure 2.



Similar positive changes were observed in acquisition of expressive language where a difference (10.33) between pre and post intervention mean scores was found to be significant ($t = 4.68, p < 0.01$) as seen in Figure 3.

Figure 3.

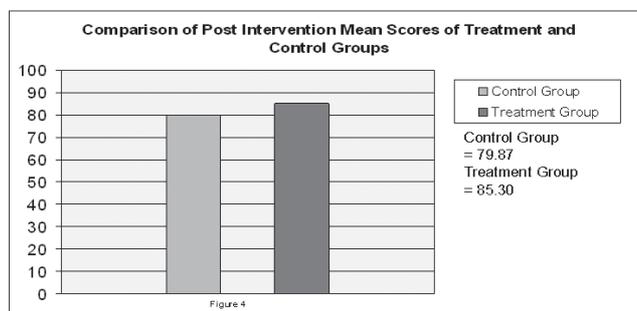


Since the age group of children ranged from 5 to 10 years, the data were further analysed using ANOVA to determine if age as a variable had any effect on development of communication skills. The resultant F-ratio value (0.15) was not significant. This indicates that visual strategies training benefited all children, and age as a concomitant variable had no significant effect on their post intervention performance.

Comparison of performance of treatment and control groups

The second objective of the study was to determine if use of visual strategies would be more effective than communication training given regularly by classroom teachers. For this purpose, the post intervention scores of both treatment and control groups were analysed. The data analysis showed that mean scores of the treatment group (85.30) was higher than that of the control group (79.87). However, this difference was not significant ($t = 0.61, df = 28, p > 0.05$) as seen in Figure 4.

Figure 4.



This pattern of higher, but statistically not significant mean differences was found in both receptive language (mean difference = 3.33, $t = 0.76$, $p > 0.05$). and expressive language skills (mean difference = 2.14, $t = 0.42$, $p > 0.05$) of both groups. These findings indicate use of visual strategies to be as effective as other methods of intervention for development of communication skills in children with autism.

For many autistic children, especially those with severe intellectual impairment, an even more concrete representation of the concept may be needed. For such children, use of three dimensional representation of the actual object example (e.g. a toy bed for a bed) is required. Visual strategies to which a subject responded best, were selected for intervention for him/her. In some cases, a combination of strategies was used, for instance, picture / symbols for expressive skills and signing for developing expressive skills.

Figure 5.1

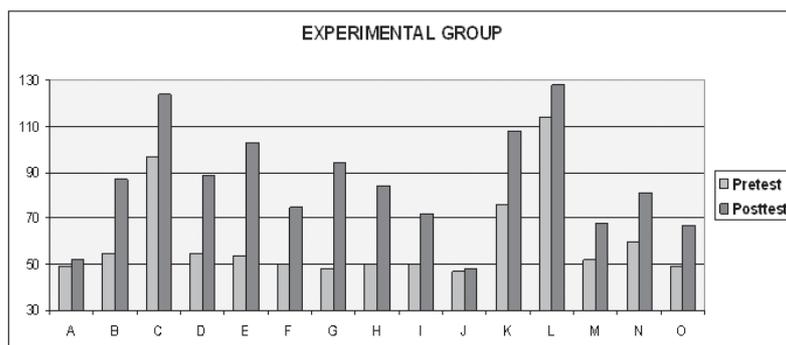
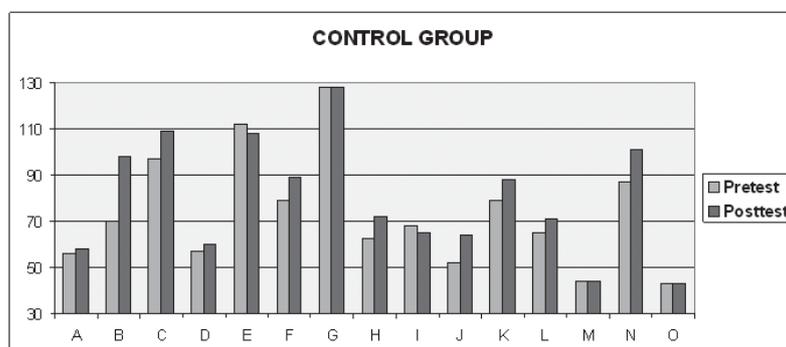


Figure 5.2



Visual prompts and reinforcers were provided to facilitate learning. The significant difference in the pre and post intervention mean score of the treatment group is indicative of the positive effect of intervention. Though the comparative analysis of the post intervention scores of treatment and control group did not result in a statistically significant difference, it must be noted that treatment group children showed a greater increment in their performance from pre to post tests (60.4 and 85.3 respectively), as compared to control children who gained about 6 points from pre (73.26) to post test (79.86). The non significant difference between the treatment and control group may be due to a sampling error that caused inclusion of some high functioning children in the control group. Individual scores of the children in the treatment group showed that most of them performed better than their peers in the control group (as seen in Figures 5.1 and 5.2). The initial chance differences notwithstanding, the children who received intervention through visual strategies, performed better on communication skills than their peers in control groups.

DISCUSSION

Absence of pointing and failure to follow pointing are early signs of autism. Hence, it is important that communication includes a lot of exaggerated gestures in order to call the child's attention (10). Autism is frequently accompanied by additional developmental problems such as specific language impairment and/or intellectual impairment. Issues become complex when these additional problems are accompanied by communication difficulties specific to autism (11). Given the importance communication has as a prognostic indicator of future, social and educational development and later quality of life, it is imperative that intervention programmes for children with autism stress on alternative means of communication for those who have deficits in receptive and expressive language. These alternatives means using visual icons, symbols and manual signs, capitalise on strong visual processing ability in many children with autism.

Benefits of manual signs for individuals with autism have been documented (15). Signing provides a more readily comprehended means of communication, which may help understanding of communication itself and of the accompanying spoken language. Using signs while speaking, may make an interactive partner slow down their rate of spoken language and perhaps limit it to key concepts (16). These factors facilitate processing of linguistic

inputs. Visual icons such as pictures and symbols are the most basic ways of beginning communication skills. Many children with autism benefit most from communication boards with pictures or symbols of specific things in their experiences. They learn to indicate what they want by touching the icon denoting the object / activity. The spoken word on the other hand, is more arbitrary and abstract and therefore for some children more difficult to retain and associate with the corresponding physical object (10).

CONCLUSION

Research shows that information processing in autism is characterised by strength in holistic gestalt processing. This processing is well suited to the comprehension of spatially organised, non-transient information available through visual mode e.g. pictures, symbols or a written text. The results of this study, subscribe and reinforce the premise that use of visual strategies leads to better comprehension, greater involvement, and ultimately more effective expression. The children with autism who received language intervention using visual strategies, showed significant improvement in core communication skills of eye contact, joint attention and symbol use.

Since autism intervention is an emerging field in India and for many, autism still remains a puzzling condition, the findings of this research may contribute to the development of need based practices for education of Indian children with autism.

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REFERENCES

1. Van Hattum, R. *More is not enough*. In E.W. Lynch & R.B. Lewis, *Exceptional Children and Adults, USA*; Foresman & Co. 1983
2. American Speech - Language – *Hearing Association Communication Disorders & Variations*. In E.W. Lynch & R.B. Lewis, *Exceptional Children and Adults, USA*; Foresman & Co. 1982
3. National Research Council *Educating Children with Autism*. Washington D.C., National Academy Press 2002.
4. Powers, M.D. *Children with Autism: A Parents's Guide*. Woodbine House 1989.
5. Lord C, Paul R. *Language and Communication in Autism*. In D. Cohen and F. Volkmar, eds. *Handbook of Autism and Pervasive Developmental Disorders*. New York: John Wiley and Sons. 1997.
6. Wetherby AM, Shuler A, Prizant B. *Enhancing Language and Communication; Theoretical Foundations*. In D. Cohen and F. Volkmar eds. *Handbook of Autism and Pervasive Developmental Disorders*. New York: John Wiley and Sons. 1997.
7. Hodgedon L.A. *Visual Strategies for Improving Communication : Practical Support for School and Home*. Troy : Quirk Roberts Publishing. 1995.
8. Hodgedon L. A. *Visual Strategies for Improving Communication : Practical Support for School and Home*. Troy : Quirk Roberts Publishing. 2000.
9. McClannahan, L. & Krantz, P.J. (1998) **Social interaction skills for children with autism: a script fading procedure for beginning readers**. *Journal of Applied Behavioral Analysis* 31:191-202
10. Siegel, B. *The World of Autistic Child*. New York : Oxford University Press. 1996.
11. Jordan R, Powell S. *Understanding and Teaching Children with Autism*. New York : John Wiley & Sons. 2000.
12. Mirenda P. *Using AAC to reduce problem behaviour*. *Augmentative Communication News*. Vol.15, No.4. 2003.
13. Lal R. *Effect of Inclusive Education on Language and Social Development of Children with Autism*. *Asia Pacific Disability Rehabilitation Journal*, 2005;16, (1) 77-84.
14. Lal R. *Effect of AAC training on language development of children with mental retardation* In Jacob, N (Ed.) *Silent Revolution: Proceedings of the Conference on Augmentative & Alternative Communication*. 2006.
15. Fakih N. *A Study on Effectiveness of Training in AAC on Language Communication and Social Behaviour in Children with Autism*. Unpublished M.Ed. Dissertation, S.N.D.T. Women's University, Mumbai. 1999.
16. Lal R. *An Experimental Study on Inclusion of AAC System in the Curriculum of Teacher Training in Special Education, and its effect on Language Development of Children with Mental Retardation*. Unpublished Ph.D., Dissertation, S.N.D.T. Women's University, Mumbai. 1999.