Benefits of the Treatment and Education of Autistic and Communication Handicapped Children (TEACCH) programme as compared with a non-specific approach

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Abstract

Background  Two educational treatments were compared, the Treatment and Education of Autistic and Communication Handicapped Children (TEACCH) programme and the integration programme for individuals with disabilities.

Methods  Two groups of eight subjects were matched by gender, chronological and mental age, and nosographic diagnosis (i.e. autism associated with severe intellectual disability, DSM-IV criteria and Childhood Autism Rating Scale scored. The TEACCH programme was applied to the experimental group, while the control group was integrated in regular schools with a support teacher. The Psycho-Educational Profile – Revised and the Vineland Adaptive Behaviour Scale were administered twice with a one-year interval between assessments.

Results  The scores of the experimental group increased more than the control group scores. Statistically significant differences were obtained in both groups because of the differences in the two approaches.

Keywords  autism, educational treatments, TEACCH

Introduction

It is commonly recognized that autistic disorder is the behavioural expression of organic damage, even though concurrent organic pathologies have only been found in some cases. A figure of 50% has been reported in some studies (Gillberg & Peeters 1995). Psychological, interactional and environmental factors interact with organic factors, but they do not seem sufficient to be the primary cause of the disorder (Fogliobonda 1987). In the past few decades, the aetiological orientation of autistic disorder has been modified in the light of new studies which have demonstrated the biological bases of the disorder (Schopler 1994). Intervention strategies have been progressively oriented towards a functional approach (Schopler et al. 1980).

The role of parents is now considered very important for the treatment (Schopler 1994). They are no longer considered the cause of the disorder, but rather, the most important resource and the most effective factor in promoting changes in the child’s behaviour (Schopler 1987). There are many therapeutic approaches to autism within which parents play the role of therapists or co-therapists,
but a unique resolving treatment has not been found yet. Most programmes are not specifically autism-oriented, but they are potentially useful to deal with autistic disorder, even if their validity has not yet been investigated scientifically. Consequently, further studies and applications are needed (Heflin & Simpson 1998) to confirm their validity.

The Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) programme is one of the most valid treatment programmes. It was defined by Eric Schopler as a global approach based on a close collaboration between parents and professionals (Schopler 1994). Many studies have shown the effectiveness of the programme in children with autism and severe intellectual disability (ID; Panerai et al. 1997, 1998) in reducing self-injurious behaviours (Norgate 1998) in high-functioning autistic students with Asperger syndrome (Kunce & Mesibov 1998) and in individuals who are entering the job market through support programmes (Keel et al. 1997). A few studies have compared the TEACCH programme with other interventions. Ozonoff & Cathcart (1998) examined the effects of household programmes on pre-school children and the performance of the experimental group was reported to be fourfold better than that of the control group on the basis of some PsychoEducational Profile – Revised (PEP-R; Schopler et al. 1990) subtests, i.e. imitation, gross and fine motor skills, and non-verbal concepts. An investigation of a 4-year-old child with autism associated with severe ID revealed a remarkable progression during the application of the TEACCH programme, and on the other hand, several episodes of regression were observed subsequent to the interruption of the programme and the integration of the child in a regular state school (Panerai 1999).

At the Oasi Maria SS Institute, Troina, Italy, the TEACCH programme has been applied for several years to children and adolescents with autism, as well as severe and profound ID. All the staff members have been trained by the Opleidingscentrum Autism of Anversa. The results have been encouraging; indeed, several studies (Panerai et al. 1997; Panerai et al. 1998; Panerai 1999) have revealed statistically significant improvements in all PEP-R and Vineland Adaptive Behaviour Scale (VABS; Sparrow et al. 1994) subtests, validating the effectiveness of the TEACCH programme in the present sample.

The aim of the present study was to evaluate the effectiveness of the TEACCH programme by comparing it to the classic Italian approach for the integration of children with disabilities in regular schools with support teachers. The authors hypothesized that the TEACCH programme might be more successful than other programmes in that it specifically addresses children with autism.

In Italy, any children with developmental delay [e.g. Down’s syndrome (DS), autism or ID] can be integrated in regular schools with support teachers. Cecchini (1989) made an interesting comparison between groups of children with DS from different countries and found that Italian children scored higher on both measures of IQ and developmental quotient. According to the above author, this was because the Italian school system allows children with handicaps to be integrated in regular classrooms. The legislation cannot take into account the peculiar characteristics of each developmental disorder, but schools should find specific solutions to integrate children with autism in regular classrooms, taking into account children’s specific needs in order to facilitate the integration and make it effective.

The TEACCH programme has been specifically designed for children with autism: it takes into account the features of the disorder and tries to minimize the child’s difficulties using structured and continuous intervention, environmental adaptations, and alternative communication training (Schopler 1994). It is very difficult for a child with autism to give significance to and decode reality signals, while this ability seems to develop in a natural way as a result of an inborn biological talent in non-autistic individuals (Peeters 1994). Children with autism have difficulty going beyond the perceptual aspect: it is extremely problematic for them to understand abstract concepts, gestures, the meaning of imitation, interpersonal relationships, time passing and the ‘how-when-where-why’ of events.

The TEACCH programme makes reality as clear as possible from a perceptual point of view by using visual aids. It takes advantage of the perceptual ability of children with autism, their strong point, to clarify the ‘where-how-when-how long’, and makes...
these children more independent in handling their own space and time. Moreover, it is a global programme in that it deals with any aspects of a child’s life. This is crucial for autistic disorder since it is a pervasive developmental disorder.

**Subjects and methods**

**Subjects**

Two groups of children with autism, the control group (CG) and the experimental group (EG), were matched by gender (all males) and nosographic diagnosis (i.e. autism and severe ID). In each group, there were eight subjects, and their mean chronological age was about 9 years. Children in the CG attended regular schools with support teachers, while children in the EG benefited from TEACCH programme.

Autism was diagnosed according to *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; APA 1994) criteria and Childhood Autism Rating Scale (CARS; Schopler et al. 1988) scores. Intellectual disability was also diagnosed according to DSM-IV criteria. Table 1 shows a comparison between the chronological age (CA), mental age (MA) and CARS scores of the CG and the EG. Statistically significant differences were found between the CG and the EG in that the samples were derived from two populations with statistically different means. The statistical significance was calculated using the Student *t*-test. Therefore, the EG is in a statistically disadvantaged position compared to the CG (i.e. older chronological age, younger mental age and more accentuated autistic characteristics); in four cases, one or more associated organic pathologies were present and all subjects suffered from epilepsy.

Table 2 shows the cultural and socio-economic level of children’s families, the parents’ mean age, the place of residence, and the mean number of children. The description seems representative of the Sicilian population.

**Procedure**

Subjects in the EG benefited from the TEACCH programme implemented at the Troina-based Oasi Maria SS Scientific Institute for Hospitalization and Treatment of Individuals with Mental Retardation. They resided at the institute and went home at regular intervals: during weekends, every 2 weeks or for 4 days a month. The habilitation programme was basically implemented by educators with the support of the management team, and the approval and collaboration of parents. Subjects in the CG attended regular schools and benefited from the support teacher for a certain number of hours according to Italian law. Most subjects had psychomotor therapy, speech therapy and sometimes

![Table 1](link-to-table-image)

*Features of the experimental and control groups: (CARS) Childhood Autism Rating Scale; (MS) multiple sclerosis; and (MIAs) multiple inborn abnormalities*

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physical therapy in the afternoon. Each subject was evaluated twice with a one-year interval between assessments using the PEP-R and the VABS. The PEP-R offers a developmental approach to the assessment of children with autism or related developmental disorders, and is designed to identify idiosyncratic learning patterns. Positive scores can be divided in two categories: (1) ‘passing’ when the item was achieved, and (2) ‘emerging’ when the item was partially achieved but there was not a failure. The VABS assesses adaptive behaviour and has been shown to have utility in the assessment of children with autism (Perry & Factor 1989; Rodrigue et al. 1991).

Psychologists working at the Oasi Institute administer these instruments as a routine protocol for all subjects with a suspected diagnosis of autistic syndrome. Therefore, they were not aware of the purpose of the present study.

Treatment

The TEACCH programme treatment applied to the EG is based on three fundamental principles: (1) an individual educational programme, (2) environmental adaptation and (3) alternative communication training. Individual educational intervention programmes were planned and structured for each child using data collected from the VABS and the PEP-R, and from structured observations of the child’s abilities (Schopler 1994; Schopler et al. 1995).

The CG was integrated in a regular classroom with support teachers and outpatient treatments (e.g. psychomotor and speech therapy). Neither the teacher nor the educators used structured teaching, or any other treatment method specific for children with autism.

The EG and CG subjects were treated for the same number of hours: the hours were distributed throughout the whole day for the EG group, while they were mainly in the morning for the CG group.

The principal differences between the two treatment methods are compared below.

Working group

In the TEACCH programme, EG children with autism and ID were divided in small homogeneous
groups, while each child in the CG attended regular 20-student classrooms.

**Staff training**

In the TEACCH programme, staff are specialized in the treatment of children with autism. All operators are generalists, and besides their previous education and specialization, they benefit from further training which includes theory and practice on autism. The operator must be able to face the problem in a global manner, and intervene in order to facilitate new learning within the developmental phase as well as to reduce inappropriate and disruptive behaviour.

In the CG, treatments were carried out by a regular teacher who had no specific training and support teachers who had followed a multivalent training programme not specifically designed for children with autism.

**Physical organization**

The TEACCH programme follows the principle of place–activity correspondence (any designed space is adapted to a specific activity). The environment needs to be ‘clear’ and ‘predictable’ in order to facilitate child’s attention and calmness.

In state schools, there are no discrete areas for different activities.

**Communication system**

In regular classrooms, the verbal system is normally used in combination with gestures.

In the TEACCH programme, communication is individualized (i.e. objects, pictures, drawings, written words are used according to the child’s developmental level) and represents an alternative to verbal communication, even though the two systems are often integrated.

**Intervention**

In regular classrooms, the intervention is variable because it depends on the methodology of each teacher.

The TEACCH programme follows precise routines (e.g. from left to right, and rewards are given when work is completed). This facilitates the child’s independence while decreasing the need for assistance.

**Task organization**

In regular classrooms, the material is neither individualized nor adapted to different pathologies.

In the TEACCH programme, activities are presented using specially designed material, which is individualized and perceptually clear. This facilitates an independent performance of the task, eliminating errors and accelerating, while bringing about a reduction of stereotypic behaviours (Panerai et al. 1998).

**Time visualization**

In regular classrooms, the ‘time’ of activities and their duration are decided by the teacher.

In the TEACCH programme, the ‘when’ is indicated by visual aids. Time, which is an abstract concept, is made visible: subjects can ‘see’ the schedule of the day, and at the end of the task, anxiety is reduced because they know what is going to happen later.

**Results**

Tables 3 and 4 show the PEP-R scores for the CG and EG, respectively. Tables 5 and 6 show the VABS scores for the CG and EG, respectively. As far as the total of ‘emerging’ categories is concerned, the EG showed an initial mean value of 17.5, while the CG showed an initial mean value of 18.25.

Table 7 shows the statistical significance of the differences between the time 1 and 2 PEP-R applications in the EG and the CG. Statistical significance was obtained using the Wilcoxon test. In the EG, the present authors found statistically significant results in the ‘passing’ categories for imitation \((P < 0.05)\), perception \((P < 0.02)\), gross motor skills \((P < 0.05)\), hand–eye coordination \((P < 0.05)\), cognitive performance \((P < 0.02)\), total score \((P < 0.02)\) and developmental age \((P < 0.02)\). In the CG, they only found statistically significant results in hand–eye coordination \((P < 0.02)\). The authors did not find statistical significance in ‘emerging’ categories either in the EG or the CG. Indeed, the number of ‘emerging’ items only
### Table 3
Control group scores on the PsychoEducational Profile – Revised (Schopler et al. 1990): (P) passing; and (E) emerging

<table>
<thead>
<tr>
<th>Subject</th>
<th>Imitation</th>
<th>Perception</th>
<th>Fine motor</th>
<th>Gross motor</th>
<th>Hand–eye coordination</th>
<th>Cognitive performance</th>
<th>Cognitive–verbal performance</th>
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### Table 4
Experimental group scores on the PsychoEducational Profile – Revised (Schopler et al. 1990): (P) passing; and (E) emerging

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<th>Subject</th>
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<th>Perception</th>
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<th>Gross motor</th>
<th>Hand–eye coordination</th>
<th>Cognitive performance</th>
<th>Cognitive–verbal performance</th>
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Table 5 Control group scores on the Vineland Adaptive Behaviour Scale (Sparrow et al. 1994): (P) passing; and (E) emerging

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<th>Socialization</th>
<th>Maladaptive behaviour</th>
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Table 6 Experimental group scores on the Vineland Adaptive Behaviour Scale (Sparrow et al. 1994): (P) passing; and (E) emerging

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increased in two CG subjects and three EG children.

Table 8 shows the statistical significance of the differences between the time 1 and 2 VABS applications in the EG and the CG. In the EG, the present authors found statistically significant results in personal domains ($P < 0.05$), total daily living skills ($P < 0.02$), play and leisure ($P < 0.05$), and total score ($< 0.02$).

In the CG, they only found statistically significant results in daily living skills ($P < 0.05$).

**Discussion**

The results of the present analysis are discussed taking into account the results obtained from the EG, and analysing the differences between the CG and EG results.

The present authors found a statistically significant improvement on the PEP-R scores in all ‘passing’ categories except fine motor skills. Because there were improvements in gross motor skills and hand–eye coordination, it can be inferred that abilities probably increased but they were not applied in a functional manner. This could also be caused by the motor impairment frequently found in children with severe and profound ID. Statistically significant changes were not found in the ‘emerging’ categories. This finding was probably influenced by the characteristics of the sample, which was composed of children with autism, as well as severe or profound ID. Both groups initially showed limited ‘emerging’ scores, especially the EG. Since the latter has clearly improved, it can be assumed that, despite biological autism- and ID-related conditions common to both groups, the type of treatment is crucial in order to allow the subject to learn new skills. Moreover, the present authors’ clinical experience highlights that the number of ‘emerging’ items does not exactly predict the amount of new skills to be learned.

An analysis of the VABS scale results did not show statistically significant improvements in communication and interpersonal relationships, probably because these are the most impaired areas of the autistic disorder from a qualitative and quantitative point of view. This could be partly because of the small sample studied (eight subjects) and its peculiar characteristics (they were all non-verbal subjects). Furthermore, the VABS scale only
assesses verbal behaviour. In fact, in a previous study (Panerai et al. 1998) using structured observations during different moments of the day, the present authors highlighted positive changes in non-verbal communication with objects, photos, pictures and written words.

Regarding maladaptive behaviours, neither significant decreases nor increases were observed. The effort for environmental ‘clarification’ and ‘individualization’ is probably not yet optimal enough to facilitate child relaxation. Some maladaptive behaviours could be a source of disturbance for the other children, causing subsequent excessive behavioural reactions. Gillberg & Peeters (1995) stated that maladaptive behaviours, stereotypical and self-injurious behaviours usually tend to become chronic. Previous research (Panerai et al. 1998) reported how those behaviours tended to decrease during structured activities and increase with remarkably higher frequency during non-organized leisure activities.

The analysis of the differences between the experimental and the control group results indicates that the TEACCH programme was more effective than the treatment applied to the control group. This was probably because of the differences between the two kinds of treatments.

Peeters (1994) stated that, ‘An educational model which refers to persons with developmental delay is not appropriate for those who have a different cognitive style.’ Unless the integration of children with autism in regular classrooms is accompanied by an effort at simplification, and above all, ‘clarification’, it will not have a significant outcome.

Several experiments have been carried out in Italy applying the theoretical and operational principles of the TEACCH programme within primary and secondary schools. An effort is being made to rethink the principles and modalities of school integration which, at present, are not sufficient to create the appropriate conditions for development, learning and integration.

Despite the difficulties, the present authors are trying to offer a service that could meet the real needs of children with autism, a disorder that requires global and specific interventions over the entire life span.

TEACCH is an American programme which represents a ‘model’ for operators and families. It needs to be adapted to different social and family contexts; however, it represents a valuable reference scheme for a habilitation intervention.

References


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