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## **New Visions School NeuroTechnology Replication Project 2000 - 2001**

**Michael Joyce**

### **Introduction**

This hallmark study is the largest, most convincing study showing the effectiveness of the DAVID Paradise driving a multiple system to treat children with attentional disorders. The data generated in the NeuroTechnology (NT) replication project are the result of the efforts of seven Minnesota public schools (five elementary, one middle and one K-12). The NeuroTechnology sites, referred to as Designated Learning Sites (DLS), provided one to several school personnel to participate in a three-day NT training at New Visions School (NVS)/Minnesota Learning Resource Center (MLRC). This training (by Michael Joyce and Dave Siever) provided the skills used to initiate brain training on the children in their home districts. All of the hardware, software and related supplies were provided for each site through a charter school dissemination grant. Scheduled on-site mentoring was offered along with email and telephone correspondence as needed. The following report describes the results of their efforts.

Four of the elementary schools are located in rural Minnesota (Cold Spring, Perham, Naytahwaush, Bemidji) and another is located in the west Minneapolis suburb of Hopkins. The middle school is located in a north Minneapolis suburb, Fridley. The K-12 school is in the small northern Minnesota farming community of Greenbush. The Bemidji site was represented by several elementary schools that were serviced by a Bemidji State University psychology professor.

All sites, at this time, continue to successfully operate their programs. Through the successful implementation and demonstration of these sites, there are presently nine public elementary schools and one parochial school in Minnesota, along with three schools in Wisconsin and a K-12 school in South Dakota, who have started NeuroTech programs without grant assistance. These visionary schools have found that developmental neurological functions are a necessity for all successful learners and that NT tools can address essential developmental foundations of learning.

### **The Education Challenge**

Traditionally, educators have viewed conditions such as Attention Deficit Disorder (ADD), Attention Deficit Hyperactivity Disorder (ADHD), and Obsessive Compulsive Disorder (OCD) as primarily medical conditions and therefore outside the realm of education. Typically, children with such conditions are referred to the medical world to identify an appropriate medication to ameliorate the problem behavior. Therefore, one of the critical factors for the success of this project is training for educators so they understand the neuro-physiological basis for such problem behaviors and the effectiveness of NT, in this case, Audio Visual Entrainment (AVE) in re-educating the brain.

ADD/ADHD spans a broad diagnostic category, which is being applied to more and more disorders and therefore evaluation and treatment has traditionally been left to the medical community. ADHD is recognized as one of the most complex psychiatric and neurologically-based disorders of childhood with significant representation in adolescents and adults. ADHD rarely occurs in isolation and is often combined with other conditions including depression, oppositional defiant disorder, conduct disorder, obsessive compulsive disorder, learning disabilities, anxiety disorders, and other significant psychological, psychiatric, and neurological problems (Barkley, 1981; Ross & Ross, 1982; Rutter, 1983, Whalen, 1983).

ADHD is also one of the fastest growing conditions leading to children receiving special education services in the public school setting. Children with ADHD are often disruptive in the classroom, require frequent teacher input, do not generally keep up with their peers in academic pursuits, and often

require additional services due to their significant difficulty with all aspects of learning. Additionally many children are misdiagnosed and actually have conditions of depression and anxiety. Medicating such children with stimulant medications in these cases is contraindicated and can even make their conditions significantly worse. More recently, schools have become involved to a much greater degree, and now provide screening tests to identify students with attentional disorders.

This scenario suggests that a training program that results in more or less permanent resolution of ADHD symptoms be preferred over the traditional medication management approach. NeuroTechnology (NT) is such an approach. NT has been studied extensively in clinical and research settings for the past twenty years. This approach, however, has not been utilized on a large scale in the school setting - until now. This project substantiates previous projects in schools in Minneapolis and Perham, MN and in Yonkers, NY. These demonstration projects illustrate that the public school setting is an ideal environment for conducting this type of training. This is particularly true for low-income inner city and rural families who do not have access to such training.

This project demonstrated the viability of utilizing this type of training/education process in the public elementary school setting. Because this intervention is a training process and not a clinical intervention, it is more appropriately applied in the educational setting rather than in the clinical setting. It is also clear that this intervention will not be available to the vast majority of children who need it due to the medical profession's reliance on medication management, rather than educational approaches, for such problems. Additionally, the evidence that medication compliance is significantly lower in low income families suggests that applying this training method in inner city and rural schools in low income areas would be a more effective method of addressing such impediments to learning. Further, low-income students cannot afford such training from a physician or psychologist and so do not have access to such an alternative approach for the remedy of their disability, even if it is available in their area.

This project provided the opportunity to demonstrate that effective alternatives are available that offer, in many cases, an essentially permanent resolution of student learning and behavioral challenges. This project employed AVE to address the inattention, impulsiveness and behavioral challenges in school-age children, thus reducing the need for medication management of these children and reducing the educational resources that are devoted to responding to their disabilities.

## **Participants**

Students selected had a history of learning and reading challenges, impulsiveness, and a propensity to be distracted and to distract others. The students were selected by an ongoing, dynamic evaluation process based upon referrals from classroom teachers, parents, special education staff, and/or other concerned people in the student's life. Parents were notified about their child's possible inclusion in the project and they were invited to information sessions conducted by project staff. Parents and teachers completed a behavior rating scale, while the students completed a standardized reading inventory. The majority of the 204 students participating in the NT project were of elementary age.

## **Apparatus**

The AVE device used was the DAVID Paradise XL (manufactured by Comptronic Devices Limited, Edmonton, Alberta, Canada). The eyeglasses for the DAVID Paradise XL are field independent, in that they are able to independently stimulate the individual left and right visual fields of each eye thus producing a different frequency in each hemisphere of the brain. In this project, independent field stimulation was chosen.

At two sites the DAVID Paradise XL was attached to a multi-user amplifier, which enabled up to ten students to receive treatment simultaneously. Each student had his/her own station, which consisted of a set of headphones and an eyeset. The students could control both the audio volume and the light intensity. The students preferred brighter intensities, between approximately 400 and 600 lux (full spectrum) measured approximately 0.3 inches from the eyeset screen (approximating their average eye distance from the screen).

## **Procedures**

Students participated in two or three AVE sessions (20-30 minute) per week. Occasionally there were compelling reasons to increase the frequency of sessions, so some students with severe impairments may have had daily sessions. The training is part of the student's regular curriculum, scheduled

around other activities. Training is accomplished using protocols established by the foremost clinicians and researchers in the field, modified to reflect New Visions' experience working within the school environment. Protocols were occasionally updated to reflect the continuing growth of knowledge in this field.

## Results

Data was gathered for a total of 204 students from seven different school districts that participated in the NeuroTechnology Program statewide. The average student completed nearly 30 twenty-minute sessions over a period of three months, and gained eight months in grade-equivalent oral reading scores. Pre- and post-intervention data was obtained using direct assessment and behavior rating scales completed by both parents and teachers. Oral reading proficiency was assessed with the Slosson-R reading test (Figure 1). Behavioral and personality ratings were obtained via the BDS, both the home and school versions (Figure 1).

Figure 1

