

Final Report

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EFFICACY OF TREATMENT FOR VISUAL INFORMATION PROCESSING DYSFUNCTION AND ITS EFFECT ON EDUCATIONAL PERFORMANCE

The study “Efficacy of Treatment for Visual Information Processing Dysfunction and its Effect on Educational Performance” was completed in December 2003. The aim of the investigation was to ascertain whether vision therapy (VT) programs could accelerate visual information processing (VIP) skill development in children experiencing learning difficulties (LD), and to determine what impact such programs had on subsequent educational progress.

Nineteen primary schools agreed to participate in the study, after the (then) director of Catholic Education granted permission to work with Catholic schools in the Melbourne diocese. Five hundred and seventy-nine children from grades one and two were screened at these schools. Children needed to meet three criteria in order to be eligible for further involvement in the study. Firstly, the children needed to be performing in the lower third of the class from the perspective of literacy or global achievement. The Catholic primary system administers bi-annual standardized achievement test batteries, which allowed easy identification of the children fulfilling this criterion. Secondly, eligible children needed to demonstrate quantifiable VIP skill dysfunction, by performing below the 34th percentile (for grade) on the Test of Visual Analysis Skills (TVAS). Finally, children had to demonstrate auditory-verbal language processing ability within six months of their incremental (half-year) grade level. A modified Test of Auditory Analysis (TAAS) was used for this purpose.

Two hundred and forty eight children were assessed as meeting the study’s three sample criteria and their families were invited to participate. Ninety-six families accepted the invitation. All involved children underwent a full vision examination, an IQ test, and a diagnostic test battery that included six VIP tests (visual analysis, visual-motor integration, alphanumeric character directionality, visual sequential memory, rapid automatic naming and reading-related saccadic eye movement skills) and three educational tests (reading, spelling and maths).

Children were randomly allocated to one of two groups. The experimental group underwent a VT program designed to be typical of intervention programs employed in paediatric practice. The control group received a placebo program – designed so as not to directly impact on the measured VIP and educational variables comprising the diagnostic battery, but providing similar amounts of time and individual attention for the involved children. All program activities were performed at home under the instruction of a parent or guardian. Parents/guardians and their children met with the primary researcher once a fortnight for instruction in the next set of activities and for confirmation of compliance with the previous set. Each family unit was allocated an individual appointment time. Instruction sheets were supplied for all activities and parents had access to further phone contact with the research team as required. Children were required to spend forty minutes, five times per week on their VT

program over a total of approximately three months. Three or four different activities per session were prescribed.

The diagnostic battery was re-administered to both groups immediately following program completion, and again, six months after completion of the programs. The study was masked, and controlled for IQ, grade and gender. Sixty-nine children successfully completed the program requirements and their results were analysed. The institutional ethics committee at the Department of Optometry and Vision Sciences at the University of Melbourne granted approval for all stages of the study.

Results for the entire group failed to provide unequivocal evidence supporting the efficacy of the investigated VT program. The experimental group demonstrated greater post intervention gains than controls for most educational and VIP tests, but for all measures except one (visual sequential memory) the differences between groups failed to demonstrate statistical significance. Comparison with normative data values showed that both groups had made significantly greater progress (subsequent to intervention) on all educational and most VIP variables, compared with that expected had no intervention occurred. This outcome showed that intervention had been beneficial, but suggested that a placebo effect was responsible for much of the demonstrated improvement.

Nonetheless, further detailed analysis did provide evidence to support efficacy of the investigated VT program for select subgroups, skills and conditions, above and beyond this placebo effect. In particular, females benefited more than males, and lower IQ (less than 95) children benefited more than their higher IQ counterparts. Spelling and the VIP skill of visual sequential memory demonstrated the greatest between-group differences. Evidence of VT program efficacy was considerably stronger when the effect of increased experience in program delivery was taken into account.

The study's findings have implications for the application of VT programs for VIP dysfunction, and for optometry's role in the management of children with learning difficulties. Further research is required to refine identification of accurate profiles for children who are most likely to benefit from VT for VIP dysfunction. Detailed analysis of VT program component activities is necessary to maximise the potential benefit, above placebo, that this intervention form can deliver. Evidence shows that analysis of component activities needs to be considered separately for males and females. The percentage of LD children for which this form of intervention is likely to be most efficacious appears to be small, but nonetheless important. It is incumbent upon optometry to build stronger clinical and research relationships with education, psychology and medicine in order to become a useful and accepted contributor in a multi-disciplinary approach to the management of children with learning difficulties.

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