Fact Sheet

Efficacy of Brain Gym® With School-Aged Children

The TRIPSCY Evidence-based Journal Club is a means for Vermont Pediatric Physical and Occupational Therapy Practitioners and others to stay abreast of the research literature and develop strategies to apply this knowledge to benefit children, their parents and school teams.

Introduction:

Therapists’, educators’ and school administrators’ interest in Brain Gym® within Vermont persuaded us to choose this intervention for our Journal Club review. Brain Gym® is marketed directly to school professionals and purports to be an effective intervention for enhancing students’ focus and academic performance through the practice of specific movement routines. Since therapists play a key role in providing current, evidence-based information to educators and other personnel working in the schools, a review of the research underpinning this intervention seemed to be important and timely.

We conducted two independent literature searches to identify peer-reviewed articles in credible journals about Brain Gym®’s efficacy in enhancing students’ academic performance. The searches yielded a systematic review by Hyatt (2007), which included three peer-reviewed articles published before 2000, and another study published after 2000 (Inder & Sullivan, 2004). Given the limited peer-reviewed research available to review, the search was broadened. Two published opinion papers and two dissertations were also located and are included in this review. Although Brain Gym®’s website refers to other efficacy research, these studies were only published in the Brain Gym® Journal and/or in languages other than English. The Brain Gym® Journal is not considered an independent peer-reviewed publication and access to this journal is limited. Consequently, articles from this journal were not reviewed.

This study examined the effect of Educational Kinesiology (Edu-K) techniques on the postural responses of 4 children with a Developmental Coordination Disorder (DCD). The authors used a single-subject, multiple baseline methodology with baseline, intervention and follow-up phases. The Edu-K intervention consisted of activities that were performed to create a state of readiness or PACE and individualized laterality re-patterning processes. PACE stands for Positive, Active, Clear and Energetic (outcomes of doing Brain Gym®). Weekly computerized Sensory Organization Tests (SOT) were performed through each phase of the study. There was a great deal of variability in the data from session to session and from phase to phase. In general, there was a decrease in the number of falls reported for all 4 children. There were some improvements in sensory system scores. Edu-K techniques may have been effective in improving postural responses in these 4 children with DCD, however, the possibility of learning the testing tasks with the weekly SOT testing cannot be discounted as a potential reason for the progress reported.


This dissertation examined the effects of Educational Kinesiology, previous performance, gender and socioeconomic status on Phonological Awareness Literacy Screening (PALS) test scores in kindergarten students. One hundred and twenty-six students from 8 kindergarten classes and 2 relatively matched rural southeastern Virginia public school participated in this study. Classes were randomly assigned to intervention and control groups. In addition to regular instruction, children in the intervention group participated in a prescribed set of 6 Brain Gym® exercises lead by their teachers for 8-10 minutes twice each school day for an entire academic year. The control group received regular instruction and did not participate in any Brain Gym® exercises. The PALS, the outcome measure used in this before and after design study, was administered in October as part of a system wide pre-assessment of kindergarten students and again in the spring. A four-way ANOVA was used to examine multiple main and interaction effects. The primary finding was a significant main effect for previous performance on the PALS. Non-significant between-groups effects included Brain Gym® participation, socioeconomic status, and gender. Study limitations included a small sample size and the lack of discussion of power or sample size estimates.
Thompson, H. L. (2007). Impacts of educational kinesiology activities on fourth graders’ reading comprehension achievement. Walden University, School of Education (Dissertation). This dissertation intended to determine if educational kinesiology would improve reading comprehension in 4th graders. Two classrooms were selected (n=40); one was the researcher’s own classroom (treatment) and a comparison classroom where students had similar characteristics. Sample size estimation and power were not discussed. The treatment group had the standard reading instructions preceded by 7-10 minutes of Brain Gym® activities for 10 weeks. The comparison group had the standard reading instruction preceded by silent reading. Two well-developed standardized measurement tools (Princeton Review and STAR Reading Test) were used to measure changes pre and post intervention. A third measure was used weekly, the Scott Foresman for which the validity and reliability is unclear. The Princeton Review showed statistical differences between groups (p=0.04) in favor of the treatment group. The STAR Reading Test did not show statistical differences between groups. Clinical importance of the changes found was not discussed. The study had the following limitations: different teachers were assigned to the two groups; quantitative measures of fidelity were lacking; the comparison group had 3 students whose skills appeared to differ from that of the group and who may have had a negative impact the groups results; and questions about whether silent reading is a true neutral addition to the control group.

Hyatt, K. J. (2007). Brain Gym®: Building stronger brains or wishful thinking? Remedial and Special Education, 28(2), 118 -124. This article was a review of the literature, which identified only 5 articles published in peer-reviewed journals. Four articles were reviewed, with one omitted due to a conflict of interest. Each study was critiqued for quality, methodology, validity, reliability, fidelity and statistical analysis. The author’s conclusion was that the research fails to support the theoretical basis for Brain Gym®. In addition, each intervention study had major methodological flaws. The author questioned whether any benefits reported in the studies reviewed outweighed potential harm and/or cost of time out of class.

Goswami, U. (2006). Neuroscience and education: From research to practice? Nature Reviews Neuroscience, Advance online publication, April 12. This article brings into question the use of unvetted practices that claim to reflect new findings in neuroscience. The author notes that teachers are very excited, curious, and eager to apply new research in brain-based learning. However, she believes that the research needed to make this possible is still in its early stages. Packaged programs such as Brain Gym® that purport to capitalize on how brains function to enhance learning are not, in her opinion, either sound or appropriate given what we know, and don’t know, to date. Rather, these programs serve to perpetuate a myth that it is easy to apply brain-based teaching strategies and by doing so, students will become better learners. Goswami highlighted new research in which specific changes in brain imaging are noted. This includes studies in which there are changes in processing patterns when individuals with developmental dyslexia are given effective programming. Other brain imaging research shows that children acquire a sense of quantity and comparative amounts at a surprisingly young age, before they have the language to express these concepts.

Jennifer Stephenson (2009). Best practice? Advice provided to teachers about the use of Brain Gym® in Australian schools. Australian Journal of Education, 53(2), 109-124. The article was written to inform the education community regarding the level of evidence of perceptual motor program such as Brain Gym®.
Perceptual motor programs claim to improve academic learning. The author cited many articles from several authors to demonstrate that there is no research evidence to support the stated benefits of the Brain Gym® program to enhance students’ learning. Further, she states that Brain Gym’s® claims have not been substantiated in its 30 year history. Its theoretical basis is not accepted by neuroscientists. The information on the Brain Gym® web site offers a document summarizing research, but the majority of studies cited were not published in peer-reviewed journals where studies are open to scrutiny and criticism. When the author investigated educational websites, she found both explicit and implicit support for Brain Gym® from Australian education departments and administrators who are responsible for providing advice/professional development. The author acknowledged that using exercises such as Brain Gym® may increase a student’s level of alertness by providing a break from academics. The children appear refreshed, which reinforces the belief that Brain Gym® is beneficial.

Take Home Message

The theoretical underpinnings (i.e., neuroscience) of Brain Gym® have not been shown to be sound. As Hyatt (2007) said, “Research findings have strongly refuted the theoretical foundation on which Brain Gym® was developed. Neurological repatterning has been described as fraudulent, cerebral dominance has not been linked to learning, and perceptual-motor training has not withstood rigorous scientific investigation” (pg. 120). The research evidence, related to the efficacy of Brain Gym® as an intervention to improve academic performance, is meager with anecdotal reports of improvement being the strongest evidence available at this time. In spite of this, there is international interest in and use of Brain Gym® in schools. Therapists should use the literature to provide guidance to schools on the use of programs like Brain Gym®, which is an unproven intervention from a neuroscience and efficacy point of view.