Brain Gym: Pseudoscientific Practice

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Abstract

There is an abundance of scams and pseudoscientific practices promising seemingly magical cures for whatever ails a person. A short viewing of late night television will readily reveal a whole host of scams that may be more effective at relieving the viewer of the cash in his or her pocket than alleviating any unwanted symptoms. Unfortunately, ineffective practices are not only advertised on late night television, sometimes, children who are compelled to attend school are forced to participate in practices that waste valuable instruction time. This paper will provide a brief review Brain Gym which is one commercial program used in schools in over 80 countries under the assumption that it will improve student learning and a whole host of other skills, without actually teaching the skills. There is no quality empirical evidence supporting this claim, yet schools continue to expend valuable time and fiscal resources on such programs.

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In the United States and across the globe, teachers are being called upon to integrate best practice with scientific evidence to provide a quality educational experience for the children with whom they work. In the US, specifically, two federal laws, the No Child Left behind Act of 2001(NCLB) and the Individuals with Disabilities Education Act of 2004 (IDEA), require schools to provide students with academic instruction using scientific, research-based methods whenever possible. Unfortunately, teachers have difficulty following these laws when they lack the skills needed to determine whether a particular practice has a sound scientific basis. While there is debate in the field regarding the level of scientific rigor needed for a particular methodology to be judged as evidence-based or research-based, there are general guidelines that can be used by individuals who may not have a high level of training in research methodology to determine the likelihood that a particular educational intervention may have merit (Cooper, Heron, & Heward, 2007; Cozby, 2007; Kazdin, 2011; Moran & Malott, 2004). Some of these guidelines include: 1) the findings of controlled research studies should be published in high quality peer-referred journals, 2) the findings should be replicated in subsequent studies to help demonstrate that the changes in performance were related to the intervention and didn't happen by chance or due to some unknown environmental factor, and 3) the body of research is conducted by impartial researchers. Some indications that the program has not been supported by impartial research include the following: 1) the intervention program became popular due to its portrayal in the media before receiving research support, 2) the body of research associated with the program was primarily conducted in-house by individuals or organizations who had a

vested interest in the program, 3) the evidence provided was primarily anecdotal in nature (anecdotal stories may be interesting but cannot serve as a substitute for research), 4) the program purports nearly miraculous results with little or no effort on the part of the subject, and 5) the program is based upon previously discredited theoretical propositions. Finally, it is important to recognize that the responsibility of demonstrating the efficacy of the program rests with the developer not the consumer.

Brain Gym is one popular program that has failed to provide research support for its use (Hyatt, 2007; Spaulding, Mostert, & Beam, 2010). The developers claim that performing simple movements will improve intellectual and physical development, bringing swift improvements in areas such as reading and writing. They go further with their claims and state that Brain Gym activities will help a wide array of activities such as salesmanship, surfing, attention deficit (Official Brain Gym Website, 2005), discipline, fine motor control, and vision improvement for seniors (Brain Gym International Website, 2011). Perhaps due to these claims or due to simple ignorance and gullibility, Brain Gym has gained a large amount of support amongst educators in the United Kingdom, United States, and as well as other countries. This paper will provide a brief review of the Brain Gym program (for in-depth reviews, see Hyatt, 2007; and Spaulding, Mostert, & Beam, 2010) and present evidence why the program itself should not be considered a scientific, research-based method to be used in a classroom environment by educators. This paper will contain a brief review of the assumptions made by Brain Gym and its failed theoretical foundations (neurological repatterning, cerebral dominance and perceptual-motor training) (Hyatt, 2007; Spaulding, et al., 2010).

Brain Gym is based on a simplistic view of neurological functioning and promotes the view that learning problems arise due to the inability of different parts of the brain to work in a coordinated manner (Hyatt, 2007). This means in order to have different sections of the brain operate in a coordinated manner, an individual needs to activate his or her mind by using different movements that integrate the specific brain functions. As Stephenson (2009) noted, the Brain Gym program consists of 26 exercises claimed to bring about "rapid and often dramatic improvements in concentration, memory, reading, writing, organizing, listening, physical coordination and more" (p. 110). According to the Brain Gym website, these 26 exercises assist with three aspects of the brain's functioning, based on their over-simplified and questionable view of brain operation. One aspect is *laterality*, which refers to the coordination between the right and left hemispheres of the brain, particularly relevant to reading, writing, listening, speaking, and the ability to move and think at the same time. Another aspect is *focusing*, which refers to coordinating the front and back section of the brain in order to affect ones comprehension and attention-deficit/hyperactivity disorders. Finally, the last aspect, *centering*, refers to the coordination of the top and bottom of the brain that is necessary to balance rational thoughts with emotion (Hyatt, 2007). One of the main theoretical foundations of Brain Gym® is the suggestion of *neurological repatterning*. This refers to the belief that the development of the individual must encompass all the developmental stages of the species, from primitive to complex in order for efficient neurological and intellectual development (Spaulding, et al., 2010). If motor skills associated with a developmental stage were skipped by a child, then the neurological development could also be stalled and learning abilities limited (Doman, 1968). According to this theory, if a child learned how to walk before he or she learned how to crawl properly, his or her learning could be negatively impacted. Belief in this theory could encourage

educators to deem that if their students are having difficulty in reading, the skill may be improved by re-teaching the children how to crawl appropriately instead of requiring the teacher to re-evaluate his or her teaching practice and curriculum. Since the foundational belief is that the problem resides in the child's faulty neurology, the child would be provided with exercises that mimic the primitive motor development missed during infancy and/or toddler years in order to ensure that movements at all stages of development are mastered correctly. The proponents of repatterning, also called Doman-Delacato procedure, failed to provide evidence supporting their theory. In a review of the Doman-Delacato procedures, MacKay, Gollogly, and McDonald (1986) clearly described the different crawling treatments associated with the procedure and noted that the program was not effective in improving performance in children with disabilities. In 1968 and again in 1998, the American Academy of Pediatrics published strongly worded and unequivocal warnings regarding the use of the neurological repatterning intervention and noted that inclusion of ineffective, pseudoscientific practice should be incorporated in medical training programs to ensure that new physicians are aware of the failures of the past, thereby, decreasing the likelihood of those practices being used at a future point in time. So for educators, the message seems clear, rather than teaching students how to crawl and hoping that will improve academic skills, educators must implement interventions that have actually been supported by scientific, research-based studies and are related to the skill being taught. For example if one wants a child to crawl, teach him or her to crawl, but if one wants a child to read, teach him or her to read using evidence-based interventions to the extent they are available.

Cerebral dominance is a second theoretical foundation of Brain Gym that has failed to meet the rigors of scientific inquiry. Cerebral dominance refers to the idea that reading difficulties resulted from problems with cerebral dominance, particularly prevalent among individuals who were left-handed, left-footed, or had mixed cerebral dominance (Orton, 1937, Spaulding, et. al 2010). This belief, while not supported by the research (Mayringer & Wimmer, 2002; Mohan, Singh, & Mandal, 2001), forms a basis for many of the Brain Gym exercises. An example of an intervention focused on cerebral dominance would be teaching students the names or sounds of letters by having them trace or write the letters in the air as well, similar to the *Lazy Eights* activity in Brain Gym as described by Spaulding, et. al (2011).

Perceptual-motor training is the third major theoretical foundation of Brain Gym in which little to no empirical evidence has been shown to date (Kavale & Mattson, 1983). Perceptual-motor training is based on a belief that learning problems are related to the faulty integration of perceptual and motor skills (Hyatt, Stephenson, & Carter, 2009). The Doman-Delacato repatterning procedure previously discussed is technically a perceptual-motor program, but was presented separately due to its unique focus on crawling and absolute failure to remediate skill deficits. As with the other foundational concepts of Brain Gym, perceptual motor programs assume that the difficulty resides within the child, and the appropriate perceptual skills should be taught to the student to enable the child to overcome their learning problem(s). Some of the strategies used in order to improve perceptual-motor skills and improve learning have included activities such as crawling, walking on a balance beam, jumping, bouncing balls, and activities similar to carnival games, but none directly related teaching the target academic skill. Overall, increased ability in the above skills were assumed by Brain Gym to result in a more efficient reading ability. However, to date a considerable amount of research has failed to demonstrate that perceptual-motor training activities are effective academic interventions. Nevertheless,

"Despite little evidence validating the efficacy of perceptual motor training or substantiating perceptual-motor assessments for predicting later reading ability, it continues to have intuitive appeal for BGI (Brain Gym® International)" (Spaulding, et al., 2010, p. 21). Similarly, Salvia and Ysseldyke (2007) note the "appalling lack of empirical evidence" supporting the use of perceptual motor training programs as academic interventions (p. 377).

Ultimately, while a great deal has been written about the Brain Gym program and its applications in academics, it has generally been written in-house and published through Brain Gym's own magazine and/or not been subjected to careful and rigorous investigation. Most reports claiming the program's efficacy are testimonials, such as:

> *We cannot believe the improvement in our daughter after five sessions with you. Before we were referred to you, our daughter Abigail, age 8, could not tie her shoes without help, could not ride her bike without training wheels, and was having a difficultly reading at her grade level. Since working with you, Abigail is riding her bike without assistance and training wheels. She is tying her shoes by herself, but most important her reading rate and reading fluency have greatly increased, which has also increased her reading comprehension… we feel that Brain Gym® provided the missing link so that Abigail's body could integrate all the previous therapy. Because of your work, Abigail has made huge improvements academically and socially in a very short time period. (Brain Gym, 2011)*

As noted by Spaulding, et al., (2010) when discussing testimonial evidence, "While these testimonials are persuasive, passionate, and compelling, they do *not* meet the established criteria for quality research in special education … articles are descriptive explanations of what an individual experienced through participating in BGI activities or how an educator, caregiver, or trainer used BGI activities with individuals in their workplace" (p. 26).

In conclusion, given the limited time children are able to spend in the classroom environment, educators need to implement practices that have been validated by empirical research and not waste valuable time participating in the nuisance of Brain Gym or other pseudoscientific interventions that claim to provide a magical cure for all that ails humanity. As with the recommendation from the American Academy of Pediatrics regarding training of new physicians in the ineffective fads of the past, it seems that educators must also receive training in past fads lest they continue to commit the errors of the past. In addition, they must be informed of past failures since the practices are commonly re-packaged and marketed through slick advertising campaigns. Barring research that does support the efficacy of Brain Gym, its use as an academic intervention should be abandoned.

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Additional Biography

www.badscience.net/category/brain-gym/ This site provides access to a website called bad science. It is a nice place to check when investigating the efficacy claims of many practices that appear to be controversial or pseudoscientific.
www.youtube.com/watch?v=M5rH7kDcFpc This is a link to part 1 of an eye-opening investigation and review of Brain Gym practice in the United Kingdom. In 2008, Jeremy Paxton from Newsnight conducted this approximate 9 minute review.

www.youtube.com/watch?v=YjRhYP5faTU This is the link to Part 2 of the Newsnight review in which the founder of Brain Gym, Paul Dennison, is interviewed by Jeremy Paxton. This testy interview lasts about 5 minutes.
www.thesekpticsguide.org This site does not address Brain Gym, but is a great source of information for scientific inquiry and logical argument. They even have a free podcast. The leader of the group, Dr. Steven Novella, is neurologist at Yale University School of Medicine.

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