

Brain Gym

What claims does the company make / what does the programme target?

According to the Brain Gym website, the programme claims to be used “by people of all ages and abilities for a variety of reasons”. The programme is allegedly effective in school classrooms, and for children with special needs and learning disabilities. Brain Gym claims that the programme can also be used to help corporations, athletes and health professionals.

The specific areas that Brain Gym allegedly targets include concentration and focus, memory, academics (reading, writing, maths), physical coordination, relationships, self-responsibility, organisation skills and attitude. The website also notes that “it is not clear why these movements work so well”. The website claims that the programme brings about “dramatic improvements” in these areas.

Evidence for efficacy:

The audit focused on independent research, peer reviewed articles – these are not evident for Brain Gym. Research has been conducted with Brain Gym, but has only been published in the Brain Gym funded non-peer reviewed *Brain Gym Journal*.

University of Auckland’s Audit - www.cogaudits.org

Khalsa, Morris, & Sift (1988):

Khalsa et al. investigated whether Brain Gym exercises and “restructuring” activities would affect the static balance of sixty 7 to 11 year old children with learning disabilities. Children were assigned to 1 of 3 groups:

- Movement Group: did four Brain Gym exercises (hook-ups, positive points, cross-crawl and thinking cap) for 5 mins, twice a day, 5 days/week for 6 weeks.
- Restructured Group: received a 10 min individual session of combined arm and leg movements coordinated with specific eye movements prior to engaging in the same 6 week Brain Gym programme as the Movement Group.
- Control Group: received no exposure to any techniques.

Static balance was pre- and post-tested in each group using a modified version of the Stork Stand Test. The study found that there were no significant differences between groups prior to “treatment” (although in their discussion section, the authors say that one of the group’s mean score was “well below those of the other two” – so there is some inconsistency in the reporting of results). Post-test results suggested that the restructured group showed the greatest improvement, followed by the movement group and then the control group.

Limitations: training for the movement and restructured groups was conducted by class teachers, but they did not specify how many or what the teacher:child ratio was; no academic measures were used; did not mention whether teachers received any training on procedures; did not say whether any procedures were used to ensure that training was reliable (e.g., did students know why they were doing the exercises? It is possible that some teachers may have told the students what the training’s purpose was.); used gain scores as the dependent variable, which is said to have unknown reliability (Hyatt, 2007).

Sift & Khalsa (1991):

60 college students (19-40 years) were randomly assigned to 1 of 3 conditions:

- Movement group: participated in 7 Brain Gym activities.
- Repatterned group: engaged in combined arm and leg movements coordinated with specific eye movements for 10 minutes prior to completing the same Brain Gym activities as the Movement Group.
- Control group: sat quietly for 10 mins.

Only one Brain Gym training session was administered. Subjects were pre- and post-tested on simple and choice response-time tasks.

The authors claimed that there was a significant difference in improvement between groups on the 4 choice task, with the repatterned group showing the most improvement, followed by the movement group and then the controlled group (see limitations below regarding these results). There were no significant differences between groups on the simple choice task. The authors say that this is evidence that educational kinesiology movements "can enhance performance after only one exposure" and argue that these results "support the notion that the Edu-K techniques may influence the processing capacity of the central nervous system through an integration of the hemispheric activity".

Limitations: no explanation of exactly how the movements are influencing the processing capacity of the central nervous system, conclusions seem dramatised; no academic measures; no mention of whether procedures were in place to ensure reliability of training; gain scores used; did not determine if there were any pre-test differences in performance between the groups; claimed that the repatterned group showed the most improvement, followed by the movement group and then the control group — however, Hyatt (2007) notes that no interaction effect was found — just a main effect of testing time, which indicated that the response times of all three groups had decreased: therefore, we cannot actually attribute the results to the intervention.

De Los Santos, Hume, & Cortes (2002):

The article is primarily concerned with increasing the success of Hispanic students in higher education. An "empirical case" using Brain Gym as well as classical music experience on younger, primary school students is given as an example of a "learner oriented technique that appears promising for Hispanic students". Students from low-achieving pilot ($n = 398$) and control ($n = 596$) schools, both of which had 99% Hispanics in the school population, were recruited to participate in the study. The pilot school used an "I Am Smart" programme, which involved experiencing classical music and Brain Gym exercises (20 mins/day) over the Spring semester. The control school continued with their regular academic programme. Pre and post measures were all teacher rated.

The study found that 3rd, 4th and 5th graders (combined) from the pilot school showed greater improvement in reading, writing and maths than those from the control school. Additionally, both 1st and 2nd graders from the pilot school showed greater increases in a measure of academic achievement (Iowa Test of Basic Skills) than those from the control school.

Limitations: authors did not mention whether procedures were in place to ensure training fidelity; comparisons were made but authors did not mention what tests were done and whether these were statistically significant.

Note: while these studies have been in the "Evidence for Efficacy" section, it is important to note that they are not of good quality. Spaulding, Mostert and Beam (2010) looked at whether these

studies met Essential and Desirable Quality Indicators necessary to be considered high/acceptable quality, and found that none did. In addition, only the study by De los Santos et al. looks at academic achievement. Hyatt (2007) also noted that both the Khalsa et al. and Sifft & Khalsa studies were published in a journal whether authors pay for publications.

Evidence against efficacy:

Hyatt (2007); Spaulding et al. (2010):

Hyatt and Spaulding et al. both critically review the (somewhat limited) Brain Gym literature and its theoretical foundations. Criticisms regarding the studies evaluating Brain Gym's efficacy have been included in the limitations for each study above. Regarding Brain Gym's theoretical foundations, both articles mentioned several points of concern:

- *Neurological Repatterning*
Hyatt (2007) noted that several organisations (American Academy for Cerebral Palsy, American Academy of Neurology, American Academy of Pediatrics, American Academy for Physical Medicine and Rehabilitation, American Congress of Rehabilitation Medicine, American Academy of Orthopedics, Canadian Association for Children with Learning Disabilities, Canadian Association for Retarded Children, Canadian Rehabilitation Council for the Disabled, and the National Association for Retarded Citizens) issued a combined cautionary statement regarding the Doman- Delacato procedures that Brain Gym is based on. Specifically, they stated that there were concerns with the procedures and its claims of success, despite the lack of supporting empirical evidence. Additionally, Spaulding et al. (2010) noted that several studies had invalidated the Doman-Delacato procedures even prior to the creation of Brain Gym.
- *Cerebral Dominance*
In general, research has refuted the idea that cerebral dominance affects learning (see Hyatt and Spaulding et al. for cited studies).
- *Perceptual-Motor Training*
Again, studies have not demonstrated that perceptual-motor training impacts learning (see Hyatt and Spaulding et al. for cited studies). In addition, Hyatt mentions that several organisations (The American Academy of Pediatrics, American Academy of Ophthalmology, and American Association for Pediatric Ophthalmology and Strabismus) have issued a combined statement strongly discrediting vision therapy (an area of perceptual-motor training that is incorporated in into Brain Gym).

Brain Gym has been referred to as "pseudoscience", particularly for its invalid theoretical assumptions and lack of good quality, peer-reviewed research. Indeed, an article by Lilienfeld, Ammirati and David (2012) used Brain Gym as an example of pseudoscience when discussing pseudoscience warning signs. It was criticised particularly for its lack of peer-reviewed research. Additionally, each of the 26 exercises claims to improve certain cognitive skills, but there is no evidence of exactly how these movements bring about these improvements.

Price:

Prices vary depending on the course selected, but an Introduction to Brain Gym course costs \$145 per student. See <http://braingym.org.nz/sample-page/brain-gym-in-new-zealand/training-calendar/> for more info.

What it involves:

Brain Gym, created by Paul and Gail Dennison, is a form of 'Educational Kinesiology' or 'learning through movement'. The programme primarily involves performing 26 movements/exercises, and progression through the programme involves building on these 26 activities. These movements include:

(1) *Cross-Crawl*

The individual stands with their feet hip distance apart and thinks of their body as a "big X". They slowly bring one arm down while moving the opposite leg up to meet it, then do the same with the opposite arm and leg. It is claimed that the slow contralateral movement activates the speech and language centres of the brain.

(2) *Sit-Up Cross Crawls*

The individual lays face up with knees bent towards the head and feet off the ground. Hands are behind the head, which is lifted a few inches off the ground. They have to slowly bring one elbow and the opposite knee together. Then, while bringing the elbow and knee away from each other, they repeat with the other elbow and knee. It is claimed that this enables the left and right hemisphere of the brain to work together.

(3) *Think of an 'X'*

The individual is told to close their eyes and imagine looking at a big X, or look at a drawn large X on a blank sheet located right in front of them. It is claimed that imagining or looking at an X strengthens the neural connections between left and right hemispheres, and this enables an "understanding of details and the big picture".

(4) *Lazy 8's*

The individual sits at a table with a large piece of paper in front of them (in landscape position). They then draw an infinity 8 symbol on the paper, starting from the centre and going up and to the left and ending at the centre. They must repeat this at least 3 times and always follow the pen/pencil tip with their eyes. It is claimed that this movement helps the eyes move together and integrates the left and right hemispheres of the brain.

(5) *Alphabet 8's*

The participant does the same thing as they did in the Lazy 8 exercise, but after tracing the 8 infinity symbol 3 times, they draw letters of the alphabet (all lowercase), starting at a and proceeding to z. After drawing each letter, the participant has to retrace the infinity symbol for another 3 times.

(6) *The Elephant*

The individual must stand with their feet hip width apart, left hand on hip and right arm straight up and touching the side of their head. They then bring their left arm in front of them, perpendicular to their torso, and are told to look at their middle finger while imagining a line extending straight out from its tip. The individual must then make an infinity symbol with their extended hand, moving using their whole torso, and notice the objects furthest in the distance that their middle finger points to as they draw the infinity symbol. They must do three infinity symbols with one arm before repeating the same with the other arm. It is claimed that this exercise improves attention, recognition, perception, discrimination and memory.

(7) *Double Doodle*

Using an easel with a large piece of paper or a whiteboard, the participant has to draw a line down the middle of the paper/whiteboard (this must be in line with the middle of their body). Then taking a pen/pencil in each hand, located the same distance apart from the middle line, the participant draws the same shapes simultaneously with both pens while looking straight ahead. It is claimed that the exercise is good for hand-eye coordination, spatial awareness, visual discrimination and creativity.

(8) *Neck Rolls*

Standing or sitting, the participant turns their head to one side and takes a deep breath. They slowly exhale for 8 seconds while bringing their head down and to the other side. When their head is on the opposite side, they take another deep breath and repeat the movement. This continues for a total of three times in each direction. It is claimed that the exercise allows individuals to concentrate visually on tasks by releasing neck tension, improves vision and hearing through muscle relaxation and greater blood flow to the head, and "centres, grounds and relaxes the central nervous system".

(9) *The Owl*

Either standing or sitting, the participant brings one hand up to their opposite shoulder and pinches the trapezius muscle between the neck and shoulder. They must then turn their head toward the same side as where their hand is pinching and breathe deeply. Then, while slowly exhaling for 8 seconds, they have to bring their head down and around to the other side. The individual must then bring their head back to the starting position, but facing the gripping hand. Once this is complete, they take another deep breath and repeat the head turn as they breathe out. This is repeated one more time. Then facing directly in front, the individual must take a deep breath and exhale slowly while bringing their chin down (repeating this two more times). All the actions are then repeated with the opposite hand. It is claimed this helps to release tension, increase the participant's range of motion, and improve their focus, attention and memory.

(10) *The Rocker*

Sitting on the floor, the individual must lean back into their arms and bring their bent knees up, then cross their ankles. They must then make circular or infinity movements with their tailbone. It is claimed that this improves posture, stabilises the pelvis, increases energy and improves focus.

(11) *Belly Breathing*

Involves deep breathing. Hands are placed on belly while taking long breaths in and out. This is claimed to improve expressive communication, attention span and energy levels.

(12) *The Energizer*

Sitting in a chair with their hands rested on their knees, participants have to lean forward so that their head is between their knees. While exhaling slowly after taking in a deep breath, they have to slowly bring their torso up with their head being the last part to extend. As they fully exhale, participants can let their spine extend back as far as they comfortably can. This movement must be done for a total of 3 times. This is claimed to improve spinal mobility, flexibility, relaxation, posture, concentration, attention and breathing.

(13) *Arm Activation*

This involves arm stretches. The right arm is held straight up along the side of the head, while left arm is brought and left fingers are wrapped around the right arm. The right

shoulder is lifted and the right arm is pressed against the left fingers for 8 seconds. This is repeated for two more times with the same arm, then arms are switched and the same movement is repeated. It is claimed this can enhance one's ability to express ideas and one's focus, concentration, breathing and relaxation.

(14) *Foot Flex*

Sitting down, the right ankle is brought over the left knee. The participant squeezes and holds the tight muscles on the back and inside of the calf with their right hand and also squeezes and holds the Achilles tendon with the left hand. Then, while exhaling slowly for 8 seconds, the participant flexes their foot as far as comfortable and releases. This is repeated two more times and is then done again using the opposite hands and legs. It is claimed this can improve posture, relaxation and social expression and response.

(15) *Calf Pump*

Facing a wall, the participant leans forward and places their hands flat on the wall. They then move their right leg back with only the balls of their right foot and toes on the ground and their weight on the left leg. While exhaling for 8 seconds, they bring their right heel down to the floor, relax and bring the heel back off the ground. This is also repeated with the left leg, with the movement done for a total of 3 times for each leg. It is claimed this exercise can "improve social behaviour by increasing attention span and the ability to express and respond".

(16) *Gravity Glide* While sitting in a chair, participants bring their legs out in front of them and cross their ankles (right over left). They then breathe in deeply and while exhaling for 8 counts lean forward slowly with their arms stretching towards their feet. This step is repeated two more times and is done again with the left ankle over the right ankle. This is claimed to improve posture, increase blood and oxygen flow, and improve confidence, stability and self-expression.

(17) *The Grounder*

Standing on a flat surface, the participant stretches their right leg out to the right side of their body while pointing their foot to the right. They then breathe in deeply and while exhaling (8 counts) bend their right knee and move to the right, stopping when the knee is directly over the foot. This is done for a total of three times and is also repeated with the left leg. This is claimed to improve whole-body relaxation, spatial awareness, comprehension, short-term memory and organisation.

(18) *Water*

Involves drinking water regularly.

(19) *Brain Buttons*

The participant stands with their feet hip width apart and one hand on their belly button. Forming a V shape with the thumb and fore and middle finger of the other hand, the participant massages the soft spots under the clavicle. While doing this, they also move their eyes from side to side and are told to notice what is in front of them with a soft focus. This is done for about 30 seconds with each hand. It is claimed that the exercise "supports left and right hemisphere connections through eye movements" and is good for relieving confusion or uncertainty.

(20) *Earth Buttons*

While either sitting or standing, the pointer and middle finger of the right hand is placed on the chin and the palm of the left hand is placed over the navel (with fingers pointing downward). The participant must then gently rub the chin and navel by moving

their fingers in a small, circular motion. While doing this, the participant also moves their eyes up and down while keeping their head still and breathing deeply. The same is repeated with hands switched. It is claimed this can improve mental alertness, grounding and whole body orientation.

(21) *Balance Buttons*

While standing with feet hip width apart, the right hand is placed over the belly, and the middle and pointer fingers of the left are placed on the temporal bone. The participant balances on their left leg for a count of eight and then switches to their right leg. While balancing on their right leg, the participant switches their hands so that the left hand is placed over the belly and the right fingers are on the temporal bone. Participants then balance on their left leg again. It is claimed that this improves one's sense of wellbeing, creates a more receptive attitude and improves reflexes.

(22) *Space Buttons*

Participants stand with their right leg in front of their left leg, their left middle and pointer fingers placed on the area between their nose and upper lip, and their right hand placed on the tailbone. While breathing, the left and right hands move in circular motions and the torso is bent so that participants are looking at their right foot "long enough to register that it is their foot". While still moving the fingers, the torso is brought up and participants look out to the farthest object that they can see and again "look at the object just long enough to register what it is". They then bend the torso back down to look at the right foot. This is done twice more and is repeated with the legs switched.

(23) *Energy Yawn*

The participant can stand, sit or lie face up. While opening the jaw in a long yawning motion, they massage the left and right jaw muscles with the respective middle and pointer fingers. This is repeated at least two more times. It is claimed this can relax the jaw, enhance creative expression visually and verbally and improve balance.

(24) *Thinking Cap*

While standing or sitting, the participant gently grabs the top of both ears with the thumb and pointer fingers. With slight pressure, they have to let the thumb slide up and out of the ear before grabbing the part of the ear directly below the area that was being pulled. The thumb is then slid off the ear all the way down to the bottom of the lobe while giving the whole outer ear a massage. This is repeated at least two more times. It is claimed this can improve breathing, energy, focus attention, hearing, peripheral vision and equilibrium.

(25) *Hook-Ups*

Participants can stand, sit or lie down. The right ankle is crossed over the left ankle. The right wrist is crossed over the left wrist, with fingers interlocked and right wrist on top. Participants then bend the elbows out and gently turn the fingers towards the body until they rest on the sternum. They then breathe deeply while maintaining the position and placing the tongue on the roof of the mouth. To finish, the arms and legs are "un-hooked", the legs are kept hip distance apart, hands are placed at belly level and the position is held for about 8 seconds. This exercise is supposed to help to "connect the electrical circuits all over the body", thus enabling better focus and relaxation.

(26) *Positive Points*

Either standing or sitting down, the participant has their hands crossed in front of them and thumbs hooked together. All fingertips except thumbs are placed horizontally

along the forehead. Hook-ups can also be done if desired. The position is held until “emotional stress is released”. It is claimed that the exercise can relieve stomach aches, contribute to greater hormone regulation (apparently blood flow to the hypothalamus is increased) and contributes to more relaxed, clear thinking (apparently from increased blood flow to the frontal lobes).

Brain Gym is based on the notion that learning difficulties arise due to poor coordination and integration between different sections of the brain and body. Therefore, the exercises aim to improve the integration of specific brain functions with body movements. This idea draws from three main theories:

- *Neurological Repatterning*

The ‘neurological repatterning’ theory is based upon the ideas of Doman and Delacato (as cited in Hyatt, 2007). The Doman-Delacato theory of development postulates that individuals must acquire specific motor skills at different developmental stages to ensure efficient neurological development; if motor skills associated with any of the developmental stages are not appropriately acquired, Doman and Delacato proposed that neurological development is hindered, consequently impairing learning. The Brain Gym exercises are supposed to mimic

the stages of motor development in an attempt to master the movements at each stage. Brain Gym claims that this “repatterns neurons” so that the individual becomes “neurologically intact and ready to acquire academic skills”.

- *Cerebral Dominance*

This is based on work by Orton (as cited in Hyatt, 2007), who theorised that mixed cerebral dominance (i.e. left handedness, eyedness, footedness or mixed preference) was responsible for reading difficulties. Orton suggested that the most effective way to teach reading was to “integrate the right and left hemispheres of the brain by combining kinaesthetic and tactile learning strategies with visual and auditory exercises”. This idea is reflected in several of the Brain Gym exercises.

- *Perceptual-Motor Training*

The approach postulates that learning problems arise as a result of inefficient integration of visual and auditory perception with motor skills. Therefore, remediating learning problems would involve training the appropriate perceptual skills, which supposedly enables the child to overcome their learning deficits.

References:

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Website / for more information see:

<http://www.braingym.org/about>; for details on the 26 exercises:

<http://www.healthythyroidcenter.com/therapy/braingym/movements.html>.