DISSERTATION

DISCOVERING THE EXPERIENCES OF CONTRALATERAL MOVEMENT ACROSS THE MIDLINE BY TEACHERS AND THEIR STUDENTS

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY JOAN SPALDING ENTITLED DISCOVERING THE EXPERIENCES OF CONTRALATERAL MOVEMENT ACROSS THE MIDLINE BY TEACHERS AND THEIR STUDENTS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION
DISCOVERING THE EXPERIENCES OF CONTRALATERAL MOVEMENT
ACROSS THE MIDLINE BY TEACHERS AND THEIR STUDENTS

This study explored teachers' perceptions about the use of Brain Gym® midline movement exercises to improve students' posture, focus, and behavior in the classroom. Brain Gym®, the registered trademark for Educational Kinesiology, is a learning readiness process to educate the mind/body system through midline movement activities. Two pilot studies guided the design of this case study research.

Sixteen teachers and 63 students from 11 different public or private schools participated by using 26 midline-crossing exercises for a period of eight weeks. Thirty-nine students were males, 24 students were females. Students' ages ranged from 6 to 11 years old; the mean being nine years. All students were identified as having some sort of learning or physical challenge including ADD or ADHD.

Data was obtained from teachers who reported about their own changes and those of their students using the Brain Gym® exercises daily. Data were collected on student observation forms and analyzed using visual analog scales. Findings showed that teachers perceived 33% of the students made improvements in their posture, focus, and behavior. Most students (54%) showed varied improvements and the remaining 13% were perceived as not demonstrating any improvements. Teachers also perceived that for children with physical challenges; 48% improved minimally, 39% demonstrated some improvement, and 13% greatly improved.

According to teachers, students who did not learn to cross the midline were also unable to focus on their work and or to decrease their behavioral outbursts. Conversely, students who learned to cross the midline were noted to have higher reading, math, and

handwriting scores. Other observations were that as students' posture became more stable, their sense of personal space was more defined. Furthermore, teachers perceived a greater calmness in the classroom and in their own demeanor as a result of implementing the exercises regularly.

Conclusions support that movement exercises in the classroom are important to teachers and students. There is some evidence that academics improved following the use of Brain Gym activities. Further research studies using experimental designs are warranted. Recommendations are that researchers study the effects of movement over a longer period of time and use in-depth Brain Gym methods.

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CHAPTER 1: INTRODUCTION

In this study I wanted to discover if and how the concept of the midline, in the ability to learn, is important to students who have trouble focusing in school. In addition, I wanted to learn about how the teachers' experience in using midline exercises in the classroom is relevant to the students' process of focusing on academic subjects.

Since 1990, I have been teaching classes to teachers in the United States and internationally in Russia, the Balkans, and in Central America. During that time I have seen an increase in the incidence of children labeled with the inability to focus in the classroom. In the United States, since 1990 the figure has risen from 900,000 to nearly 5 million or 6 to 10 % of the population, Jennings (2000).

During the past five years in my private practice with students in Educational Kinesiology, I have also had a significant increase in the number of children whose parents or teachers think they cannot focus on their schoolwork and therefore should be diagnosed ADD or Attention Deficit Hyperactive Disorder (ADHD). Educational consultants such as Goddard (1996), Odell & Cook (1997), and Masgutova (1999), whose studies in the field of integrating the reflexes within the body using movement exercises, are reporting an improvement in the ability of these children to overcome these disorders.

In a 10 week pilot study I conducted with 9 children diagnosed with Attachment Disorder and several other diagnoses which included Attention Deficit Hyperactive Disorder, I noticed changes in the ability to cross the midline through many experiential activities including art, music, writing and games that involved physical movements. The

common thread in each of these academic subjects was the use of specific movements that preceded each of these activities and that crossed the midline of the body. As the camp proceeded changes were apparent in self-esteem, motivation to do the projects, and in body posture. Students, whose constant refrain had been, "I can't," were now writing the scripts for their own puppet show. A student who stuttered and was laughed at by the others became a leader of the group and participated in two parts of a play.

Since 1990, I have taught specific movement classes for brain integration to many teachers here, in Russia, and other parts of the world. Now I am interested in observing teachers who will use the exercises in the classroom study as well as students who have difficulties with movement and subsequent problems with focusing and behavior. Using teacher observations, interviews and personal observations, I will attempt to understand this process more fully within the classroom and then use the data to generate a case study. This study will focus around the process of crossing the midline and its relevance on the ability to focus in the classroom.

Significance of the Study

This case study is significant because it addresses one of the main problems that teachers have in the classroom today, i.e. the inability of their students to focus on academic subjects. Since the Americans with Disabilities Act was enacted in 1990, teachers are required to integrate children with diverse abilities and problems into the mainstream classroom. With both parents often working our fast paced world designates the school as the primary caregiver for a child. In our society children are increasingly being labeled with learning difficulties. Many of these difficulties have been associated

with the lack of motor coordination, which includes the inability to cross the midlines of the body as explored by various researchers in the educational field. In addition, information regarding the neural plasticity of the brain indicates that movement triggers the release of a substance called BDNF (brain derived neutrophic factor) that enhances the ability of neurons to communicate with each other thus enhancing cognition (Jenson, 2000).

For the past 15 years, I have been instructing teachers in America and Russia advocating movement and experiential activities in the classroom to enhance learning. I wanted to have a first hand experience with teachers observing the differences in performing the midline movement exercises with students who have difficulty focusing on academic subjects. In this study I examined data from classroom teachers who used the midline exercises with classroom students to generate information about problems associated with the ability to learn, i.e., to cross the midline of the body using hands, eyes and ears in a way that allows all parts of the brain to function effectively for academic subjects.

Research Questions

My research questions were as follows:

1. How is midline movement training implemented and perceived by teachers and their students?
    a) What are the teachers' impressions of doing midline exercises for themselves?
    b) What are the teachers' impressions of the students' feelings about doing the midline movement exercises?

c) What changes occur in the classroom at the time of doing the exercises?

d) What other factors prevent teachers from using movement-based activities in the classroom?

2. As perceived by the teachers, how does the student's ability to cross the midline influence posture, focus and behavior in the classroom?

   a. What postural changes in the students are apparent to teachers as a result of doing the midline movement exercises?

   b. How can a teacher's use of midline movements in the classroom help students have the ability to focus while doing academic subjects?

   c. What behavioral changes do teachers note in children when they can cross the midline and do the Brain Gym® movement activities?

Limitations and Delimitations

Delimitations

Delimitations are those, which narrow a study in scope. This study will be confined to a specific group of sixteen teachers who have students in the first through fifth grades. The teachers must also be willing to do the contralateral movements in the classroom for the whole class. In addition, the teachers' observations will be limited to the students whom they have identified as having focusing or hyperactive problems in the classroom. The study was further limited to a time frame of 6-8 weeks in which teachers did the observations. After the study, teachers participated in a focus group and were contacted in the spring about their observations. The study was further narrowed in scope

by selecting categories that represented the major areas to be studied. These categories were posture, focus and behavior.

Limitations

Limitations are those, which identify the potential weaknesses within the study. In this study perhaps the strongest and the weakest part was my own participation in the study. Because I have been working in this field for the past 17 years, my biases could be a major weakness in the reporting of the data while my experience; training, knowledge and access to the participants are a major strength. Rather than putting my own imprint on the results, my challenge was objectivity. Other weaknesses might have to do with failure of some of the teachers to accurately complete the student evaluation and observations in the classroom or to teach the exercises satisfactorily to the students. As a result of imprecise reporting, the validity and reliability of information gathered might be questioned.

Definition of Terms

Brain Gym ®

A series of specific movements introduced by Paul Dennison that activate the brain and body for particular skills of learning, i.e. visual, auditory and writing.

Midline

A line within the human body where two perceptual fields meet, usually referring to left and right visual fields.

Midline Movements

A series of Brain Gym activities designed to facilitate the ability to cross three midlines of the body.

Whole Brain Learning

Learning that involves the full potential of the student to access and store memories, experiences and skills, which are meaningful and relevant to optimal growth and development.

Brain Gym exercises

Activities referred to frequently that cross the midline such as cross crawl, lazy eights, elephant eights, neck roles and others that make up the 26 exercises used in Educational Kinesiology

Educational Kinesiology

A process of drawing out innate learning abilities through the understanding of movement and its relationship to whole-brain learning patterns.

Reflex

An involuntary response to a stimulus and the entire psychological system activating it.

Primitive Reflexes

Automatic stereotyped movements directed from the brain stem and executed without cortical involvement. These reflexes must be integrated or inhibited by the age of 15 months.

Postural reflexes

Reflexes involved in the area of fine muscle coordination, ocular motor functioning, and perceptual processing. They depend on the inhibition of the primitive reflexes to allow the child to proceed to higher motor functioning.

These definitions are from the Brain Gym Journals of the Educational Kinesiology Foundation (1996,1999, 2000), and from the book A Teacher's Window into a Child's Mind (1996) by Sally Goddard of the Institute for Neuro-Physiological Psychology.

CHAPTER 2: LITERATURE REVIEW

Introduction

This research study, *Discovering the Experience of Contralateral Movement Across the Midline of the Body by Teachers and Their Students* was a multi-site case study. The data emerged from classroom observations by teachers and students on the use of contralateral movements known as Brain Gym. These movements addressed the crossing of the midline of the body doing visual and kinesthetic exercises. Emphasis was placed on students who were having trouble focusing on their schoolwork or whom were labeled ADD or ADHD.

The literature review addresses the following areas:

- Midline Crossing Inhibition
- Three Midlines
- Hemispheric Lateralization and the Midline
- Historical Background of Reflexes and Movement –Midline Crossing Inhibition

Historical studies related to the ability to cross the midline have been discussed in the literature review of this dissertation under Hemispheric Lateralization and the Midline pp. 16-23. Defined as a developmental issue, it is known as "any motor action that results in looking, reaching or stepping across the body's midline" (Woodard & Surburg, 1999).

Midline crossing inhibition is a term developed by Surburg & Easen (1993) to describe the problems encountered by reaching contralaterally across the midline of the body in diverse types of populations. Surburg (1999) believes that the process of cross-

lateral integration is finished developmentally by ages eight or nine. He and his colleagues at Indiana State University (Easen, 1993; Screws, 1997; Woodard 1999) have researched this phenomenon in diverse populations, which included pre-school children, adolescences with mild mental retardation, students with developmental delays and older populations.

In reaction time tests of 4-year-old pre-school children, Screws & Easen (1996) showed that reaction time was slower for contralateral movement than for ipsilateral movement. Mitchell & Wood (1999), investigating 3-year-olds, theorize that the inability to cross the midline could indicate later developmental challenges.

As part of their ongoing study of the midline, Woodard & Surburg (1999) investigated children with learning disabilities. Conclusions indicated that children with learning disabilities displayed midline-crossing inhibition in both the upper and lower extremities, whereas those without learning disabilities had no problems. Midline crossing inhibition was also evident for 17 adolescents assessed mildly to moderately retarded. (For more information refer to the Hemispheric Lateralization and the Midline section of this dissertation, pp. 16-17).

It is interesting to note that in a study with adults 65 to 80 years of age, Lombardi (2000), who worked in Surburg's laboratory at Indiana State University, found that normal adults exhibited the same midline crossing inhibition as those under the age of eight or nine.

Three Midlines

In a longitudinal, five year study comparing developmental movement levels with academic learning levels, Corso (1997) used the concept of three midlines as explained by

Dennison (1996), Tyldesley (1989) and VanDeGraaff (1984). In this study, she observed 28 children who did not qualify for special services but were not working up to grade level in reading and writing. To define the movement problems with students she used the frontal midline, that which divides the front of the body from the back, the transverse midline, which divides the top of the body from the bottom and the saggital midline, which divides the body into right and left sides (Van DeGraaff, 1984). Dennison (1996) cites these midlines in reference to the laterality, centering and focus capacities of the brain. (See Hemispheric Lateralization and the Midline section of this dissertation pp. 16-23 for more information). Corso found that the inability to move across these midlines developmentally was directly related to the ability to read and write successfully. She found that children exhibiting problems with the frontal midline try to read from the right side of the paper to the left. Letter reversals are common and they find it easier to move backwards. Those with problems associated with the transverse midline are slow in organizational skills, transitions from one activity to another and have problems coordinating their arms and legs.

The children who cannot cross the saggital midline that divides the right and left side of the body have problems with communication across the corpus callosum between the hemispheres (Ayres, 1971; Dennison, 1981; Diamond, 1999; Hannaford, 1995; & Kephart 1969). Corso observed that many of these children did not use creeping (crawling on their hands and knees) as a developmental mode of transportation, and those who used creeping, did not creep until they were 18 to 22 months old.

Hemispheric Lateralization and the Midline

In the twentieth century, lateralization of the hemispheres built on the reflex principal advanced by nineteenth century physiologists. The work of Michael Gazzaniga and Joseph Le Doux (1978), of the department of Neurology at Cornell University Medical College, built on the Nobel Prize winning work of Roger Sperry and Michael Gazzaniga on split-brain research. Sperry and Gazzaniga's research was an outgrowth of the clinical observations of Broca and Wernike and other neurologists. They concentrated on the physical effects of each hemisphere doing a separate job; the left hemisphere used verbal processing while the right used nonverbal intuitive skills.

Gazzaniga and Le Doux (1978) found that lateralization of the hemispheres does not mean specialization of each with no crossover of function. Their work emphasized that while evolution may determine specialization of the hemispheres, this specialization is really the potential for the expression of the linguistic functions and as such, allows both hemispheres to work together integrally to maintain mental functioning.

One of the ways the brain transfers information from one hemisphere to the other is through the cerebral midline, which maintains balance between the hemispheres and causes mental integration (Gazzaniga & Le Doux, 1978). This concept of a midline has been explored by researchers such as Jean Ayres (1971), Newell Kephart (1969), Paul Surburg of Indiana University working with Paul Dennison of the Educational Kinesiology Foundation (1991), and Bobby Eason of the University of New Orleans (1990).

In 1969, Kephart and Godfrey explored movement patterns and motor education. They referred to the midline as an imaginary middle line through the body, which separates it into two equal and symmetrical right and left sides. When a child moves, movement

should flow freely from one side to the other with no interruption at the midline. This interruption can be observed when a child is writing and will change hands as he or she crosses the midline or moves his body along ahead of the performance, or pivots his body in the direction his hand is moving. This, Kephart believed, was indicative of a motor processing problem related to inadequate performance in the right and left hemispheres.

Later, in 1971, Jean Ayres, professor at the University of Southern California, conducted a study of 148 students with learning disorders and found that there was a motor dysfunction in the right hemisphere. This correlated with the visual problems in the ability to cross the midline and suggested that children should be checked for motor function between the two halves of the body. Motor problems may be related to (Hynd et al., 1993) a smaller caudate nucleus in the basal ganglia section of the brain. Their study indicated a dysfunction of the arousal-motor regulatory systems, which point to right hemisphere deficits. Giedd et al. (1994) concurred with their study regarding their examination of a group of 18 boys with ADHD and a control group of 18 boys without ADHD. Results also indicated a motor problem related to abnormal frontal lobe development.

Surburg and Eason (1993) collaborated on a study with adolescents who were classified as mildly mentally retarded. They noted that the characteristics individuals in previous studies exhibited when they used their hand to cross the midline included time pauses, jerky rigid movement, and movement of the opposite hand so that midline crossing is avoided. In this research project, ten students were randomly selected out of seventeen that qualified for the test. All the students qualified for special education and all were mildly mentally retarded. Data from the study indicated that movements, which require

crossing the body's midline contralateral movement, were more difficult than ipsilateral movements, which stay on one or the other side of the body. The hypothesis proposed may indicate that the greater the difference between the developmental age and the chronological age the harder it is to cross the midline, indicating information processing difficulties.

The history of the midline crossing difficulty dates back to the work of Henry Head in the 1920's (Johnson, 1994). Head, while studying aphasic and speech-disordered adults, developed a test that asked patients to cross the midline to touch their ear or eye with their hand. Head's test was scored by relating the number of correct responses to the number of trials. Later, Jean Ayres added a temporal response, which required the person to respond within a time framework (Ayres, 1971).

Crossing the midline was part of Kephart's theory of motor development. He was the first to emphasize the importance of laterality. Kephart utilized this phenomenon, known as midline crossing inhibition, in his observations of children and their difficulty in referencing a center point of the body (Kephart, 1969).

Also in 1969, Dr. Paul Dennison, who directed several learning centers in Southern California, noticed that many of his clients who had learning difficulties were mixed dominant, left-eyed and right-handed. Brain Gym grew out of these clinical studies started by Dr. Paul Dennison, an educational therapist, who was looking for ways to help children and adults who had been labeled learning disabled and ADD. He worked with behavioral optometrists and body specialists to investigate how to modify learning programs to include more movement based learning. His research led him to the study of kinesiology and the relationship of muscles and posture to brain function. Through this research, he

developed patterning movements and specific activities, which he reported allowed for integration of the whole brain for learning. He found with the inclusion of more movement processes and multi-sensory approaches to learning, his students began to succeed in areas of learning they were not succeeding in previously using the traditional program (Dennison, 1996).

Dennison, like Kephart, began looking at laterality, the ability to move easily across the front midline of the body between the hemispheres and how it affects our ability to process information. He believes that laterality is the informational intelligence and is formed by the way we process spoken and written language (Dennison, 1996). In order to process this effectively there must be a clear bridge across the midline that allows the hemispheres to work together. Dennison emphasizes that in order to have full performance involving both eyes, both ears, and both hands working together, other dimensions of brain balance are involved including centering and focus.

Dennison discusses the second dimension, which he calls the centering dimension. This dimension of the mid brain relates to the fight or flight pattern. It unites the rational thought and abstract abilities of cortex with the irrational instinctual behavior of the midbrain.

The third dimension is focus, which he refers to as the attentional dimension. It involves the relationship of the frontal lobe, which contains information of the sense of self as a social being with purpose, with the hind brain which is our most primitive survival brain and when under stress causes us to hold back, to freeze and to lose focus.

In each of these areas Dennison developed specific movements that allow the individual to use the right-left, top-bottom, and back to front areas of brain balance.

These are known as the Brain Gym movements, which with several types of patterning movements form the core of Educational Kinesiology.

In 1998, at the International Educational Kinesiology conference in Toronto, Canada, several of the presenters from different countries gave workshops on the relationship of Educational Kinesiology to their work in the integration of primitive reflex movements. The consensus of opinion was that often learning disabilities, including Attention Deficit Disorder, were related to poor developmental patterns that did not allow the primitive reflexes to be extinguished. As a result, many students develop learning challenges (Diamond, 1999).

Sechenov's work in the 1860's on the inhibition of reflexes has come full circle with some of the recent research being done in Great Britain and Russia and the United States. At the Institute for Neurophysiological Therapy in Chester, England, intensive physiological programs are used with children to inhibit and integrate the primitive reflexes to assist them with more effective learning. In her book, A Teacher's Window into a Child's Mind, Sally Goddard (1996) details each of the primitive reflexes with the development of the brain and the problems associated with incomplete development. Related to the clear perception of the midline, she cites the problems associated with the retention of the symmetrical tonic neck reflex and the asymmetrical tonic neck reflex.

Retention causes problems with the ability to manipulate objects with both hands therefore the child will not be able to establish which hand, leg, or ear is dominant and there will always be a hesitancy in movement. Since the choice is not automatic, every movement has to be consciously made and is a source of stress.

As a result, the tonic neck reflexes become a barrier to crossing the midline and subsequent interchange of bilateral movement will be impaired. This affects the later ability of a person to read fluently because when the eyes move across the nose there will be hesitancy as it passes from one side to the other. During the second half of the first year when a child starts to acquire good long distance vision, the inability to go beyond arm's length vision will impair both reading, writing, and spelling. The functioning or non-functioning of the vestibular system according to Goddard may well be the link to a child being labeled ADHD or ADD and his or her inability to integrate.

This information has been born out in individual studies by O'Dell and Cook (1997). Their work emphasizes the importance of the integration of reflex patterns and their role in the development of contralateral movement, or the ability to cross the midline.

Odell and Cook integrated the work of Miriam Bender at Purdue University into their diagnostic clinic for children with learning challenges. Bender's work and research for 25 years as a clinician at the Purdue University Achievement Center for Children was concentrated on the effects of early motor development on academic success.

Using the research of Newall Kephart on learning disabilities (Kephart, 1969), she expanded his research on the gross motor problems in crossing the midline to include fine motor movements at the reflex level. Her theory is that an immature, symmetrical tonic neck reflex, which normally reaches its development within the sixth to eighth month of life and is extinguished at the age of two, causes ADHD. If a child does not inhibit or integrate this reflex then he/she will always have problems with reading and writing (Cook & O'Dell, 1997).

The importance of the integration of reflexes in movement was investigated in a study conducted by Dr. Svetlana Masgutova of the Academy of Education for the past six years with 522 people, of which 282 were children and 240 were adolescents and adults. Using the theories of Russian psychologist, L.S. Vygotsky (Ormrod, 1995), the researchers at the Academy asked the question, "If certain reflexes are inhibited or disappear with the development of higher brain centers why are they visible under pathological conditions?" According to Vygotsky's theories "the first infant movements do not disappear but continue to work with the higher nervous functions, entering into their structure as subordinated instances and transferring part of their functions to higher, younger and new centers (Masgutova, 2003).

In their ongoing study they are finding that if primitive reflexes are not integrated in infancy and in early childhood three conditions can occur: 1) excessive and inadequate loading can cause the child to become hyperactive, 2) the lack of training and poor development of a reflex (hypoactive), 3) non corresponding muscle function in relation to a reflex. They also found hyperactivity was involved in 49% of the cases in which the symmetrical tonic neck reflex was immature in the body. With the use of Brain Gym movements to cross the midline and other re-patterning therapies they hope the participants in their study will remove the stress associated with learning and integrate the reflexes into whole body movement (Masgutova, 1999).

Research projects that use specific midline movements have been documented by the Educational Kinesiology Foundation, a non-profit group begun in 1983, which is dedicated to the research and dissemination of information regarding Edu-K's effects and impacts on learning abilities in many areas. In each of the following studies from Irving

(1995) and Freeman (2000) movement activities that crossed the midline were the main focus to improve academic skills. Jan Irving, in her doctoral study at the University of Oregon with 27 nursing students, conducted an experimental study to control test anxiety using a 6-minute sequence of movement activities. In 1998, Cecilia Freemen did a year long pilot project, which resulted in findings that students in the 3rd through 5th grades, who used Brain Gym throughout the year, improved their reading test scores on a statewide standardized test (the Stanford 9) twice that of the control group, which did not use Brain Gym.

Other studies regarding Educational Kinesiology have been conducted. Witcher (2001) did a seven-month quantitative dissertation study with 126 kindergarten students in eight classrooms. Using six of the brain gym exercises for 8-10 minutes, twice a day, with a test and a control group, she only found a significant interaction for socio economic status and gender. The researcher did not find any other significant effects and discussed the results by indicating that the low sample size may have been an issue as well as the lack of females in the specific control groups. It is interesting to note that in this study that the readiness exercises and all of the Lengthening focus dimension exercises were eliminated. Camissa (1994) reported that students who were learning disabled showed a significant improvement in perceptual motor skills following an Educational Kinesiology program but no significant improvement in academic skills. Morris, Sifft and Khalsa (1998) studied the effect of Educational Kinesiology on the static balance of learning-disabled children. Using 60 children, ages 7 to 11, they found that the children who were re-patterned (Specific techniques that cross the midline involving arm and leg placements coordinated with eye placement.) and did movements exercises performed better than the

children who only completed the movement exercises. In addition, the children who only performed the movements and not the re-patterning performed better than the children who did nothing at all.

Thus we have come full circle, back to the original ideas of Sechenov and his work on the importance of the reflexes in motor development. This original work was the impetus for my desire to do an in-depth study on the midline.

Historical Background of Reflexes and Movement - Sechenov in Russia

In 1991, during the heart of the "coup" in Russia, I was a Rotary volunteer teaching at the first democratic university, Russia's Open University or as it is now known, The University of the Academy of Education. At that time, the university was located in elementary classrooms around the city of Moscow and I was teaching in a room that was used for military training similar to our R.O.T.C. Large posters bordered the room showing the children how to disassemble and put back together a Kalaschnikov machine gun and how to protect oneself during germ warfare.

In the midst of all of this, one of the members of the education class I was teaching was Professor Arnold Gotsdinner, (meaning God's Dinner, he explained to me), Doctor of Music Psychology at Moscow State University and Head of the Psychology of the Creative Work Department at the Open University. He said to me (translated), "You are not original in your work about brain integration through muscle movement. This work began in Russia in the 1860's with Sechenov, the father of Russian physiology and psychology."

According to Mikhail Yaroshevsky, Sechenov's historian for the past 50 years and author of many books including the History of Russian Psychology, the "father of Russian Psychology" brought many firsts in science to Russia (Yaroshevsky, 1990). In the middle of the nineteenth century, he was the first to investigate the integration of the body and mind and laid the groundwork in Russia for a new psychology, which studied memory, thinking and volition. He was also the first to introduce the "conditioned reflex", a theory that speculated that behavior patterns were formed as a result of external stimuli and our responses to them. Some of his most famous work included experiments, which showed that the nerve centers are capable of both stimulating and inhibiting the muscles. Later, both Sigmund Freud and Charles Sherrington, a colleague of his in England, used this concept of nervous inhibition in their work.

Sechenov believed that inner cognitive and emotional processes as well as physiological phenomena were similar in the way they functioned in the body. He saw the main cognitive and emotional elements as sensation and action. Behavior was the correlation of action with sensation, which acted like a signaling system. As a result, Senchenov believed the muscle wasn't only a motor organ but the main instrument by which a person acquired knowledge of the outer world. Therefore, he believed that thought connections and the inter-relations of things were first expressed in bodily actions in a child's first encounters with objects in the external world. Later, as the child develops, thought becomes internal but is revealed externally when the particular objects are again encountered. This internal nature of thought was due to the movements made by muscles as things were compared and analyzed. This process he believed is so subtle the individual is unaware of it (Yaroshevsky, 1990).

When I interviewed Yaroshevsky in Russia, he commented that Sechenov's ideas about the electro physiology of the brain were still being used in Russia today. Indeed in St. Petersburg, The Sechenov Institute of Physiology is an important training center known throughout Russia. Sechenov's work was considered radical at the time and was suppressed by the pre-revolutionary government. His famous work, Reflexes of the Brain couldn't be published because it opposed the prevailing philosophy of idealism, which viewed human psychology in metaphysical terms. This meant the church could govern man's view of his psyche (Todes, 1981).

Later, Pavlov's work on conditioned reflexes reflected Sechenov's ideas in Reflexes of the Brain. Pavlov's work found support because he was able to convince the government that his work was neutral and had nothing to with the concept of materialism (Amacher, 1981).

Other researchers, colleagues of Sechenov's, were working on the same concept that the entire nervous system works on the reflex pattern. In France, Thomas Laycock, working with Sechenov relied on the theories of Association Psychology that meant the reflex concept was really working together in synchronicity with all the psychological processes (Amacher, 1981). In 1906, Sir Charles Sherrington from England advanced the same principle by writing the book, The Integrative Action of the Nervous System.

When researching Sechenov's work, I asked the questions: How does his work and those who in later years used his work to advance physiology, impact the work being done today about hyperactivity and other motor learning challenges? How do the reflexive muscle movements, as investigated by Sechenov, correlate with the integrated

brain movements developed by Dennison (1991) for people with learning difficulties? I explored these questions in the American study.

CHAPTER 3: METHODS

Research Approach and Rationale

This study utilizes a qualitative case study approach. Cresswell (1994), Patton (1990), and Mirriam (1988) discuss several characteristics the researcher must look at in defining qualitative research, i.e. it must be process oriented and have meaning in how people are characterized in the world. The researcher takes the primary role in the project and must be involved in fieldwork that provides the basis for rich description that can lead to the formation of abstractions, emergent theories and concepts.

The case study approach was appropriate for the type of study I wanted to do because it included characteristics to address the process of introducing specific movement activities in the classroom. Case study can be used to answer research questions, look at real life situations and understand multiple variables. An important characteristic of case study is that it must be bounded or delimited, which means it must be a single unit around which there are boundaries (Merriam, 1998). This was accomplished by focusing the heart of the research around the use of midline movements in the classroom. It was bounded by: a) the setting - school and classroom, b) the age of the students (ages 6-11), and c) the areas where the study was conducted (several states in the U.S.). It was further bounded by the study of a specific program integral to all schools regardless of their location. A delimiting factor is that the students were chosen because of the labels attached to them, which indicated they could not focus on academics in the classroom.

The criteria the teachers used to select the students included an inability to focus on learning, and a presence of physical, developmental or behavioral problems.

In discussing how to draw meaning from qualitative data, Miles and Huberman (1994) emphasize that the data should be well grounded with rich description. Looking at the data as a participant observer, my challenge was how to take this rich description, report it, and proceed step-by-step through analysis to produce and document findings that others will regard as dependable and trustworthy. The rich description comes from the variety of teachers in different schools who freely chose to learn the movements so that they could teach them to their students. In case study research, it was important to provide enough raw data and describe it in such depth that readers can vicariously be part of the experience and consider their own alternatives and interpretations (Stake, 1995).

Because of multiple case record components this dissertation takes the reader into classroom situations both in America and in Russia. The pilot studies, the midline movement classes, the descriptions and observations of the students by the teachers and the focus groups provide a rich background of information that allows the reader to generalize from this study to his/her own situations.

Miles and Huberman (1994), Cresswell (1994), Patton (1990) and Mirriam (1998) discuss the importance of doing the analysis while conducting the study. Simultaneous analysis in this study occurred when phone observations were conducted with some of the teachers weekly and with a specific group during the sixth week of the study. Also, during the study, comments and observations from the teachers were used to develop the focus group questions.

The ability to move contralaterally across the midline of the body, which I attempted to understand through teacher observations of changes in the students' classroom activities, fulfills the case study standard as a unique and innovative educational process. It is unique and innovative because these exercises are not a standard component of the educational system in America. Since American teachers, from many different schools, used the same guidelines while performing the midline movements this case study also qualifies as a multi-site case study.

Case studies can also be evaluation studies of innovative programs (Merriam, 1998 & Stake, 1995). In the American study, teachers made a daily evaluation of three to five students chosen from their classes for a period of six to eight weeks. Teachers used a visual analog form (student evaluation) to assess the students' ability to cross the midline, note changes in their behavior, and document their ability to focus on academic material. A Visual Analog Scale (VAS) is designed to represent a linear rating scale to the respondent with minimum constraints (Linacre, 1998 & Munski, 1970). In addition to the information on the visual analog form, *meaning* as defined by Merriam (1998), was derived from teachers' weekly comments about the progress of the individual students.

Intervention

In this study my purpose was to understand what happens to focus, posture and behavior in academics when teachers introduce midline movements to students in the classroom. I wanted to explore in depth what this experience is, for both the teachers and the students.

As part of the study, teachers taught and performed the midline movement exercises daily with students for six to eight weeks. Teachers completed student evaluations during the study, observing children who were labeled as having focus problems in academic studies. (See an example of the Student Evaluation form in Figures 6 and 7.)

Participants

In qualitative research, a researcher purposefully selects informants who will best answer the research questions (Cresswell, 1994). Using participants who are familiar with the work allows me to derive information from their answers, which can be used to generate emergent theory. Though the results of this study may be generalized to school populations with the same characteristics in qualitative research, no statistical calculations are made. Therefore, the results are non-probable or purposeful as defined by Patton (1990).

Representativeness in the sample chosen comes from the fact that the student participants represent many different grades within schools and different socio-economic levels. Representativeness was further utilized through the variety of teachers selected for to the study to include special education teachers and classroom teachers. The teachers common bond is the knowledge of the specific midline exercises to use in the classroom, which they had learned in previous years. Who were the teachers and the students?

Teachers and Schools

I used 16 teachers in 11 different public or private schools. The school populations represented all socio-economic levels and many ethnic variations. There were

10 teachers from Colorado: two from the Jefferson County school district, one from the Denver County school district, one from a Catholic school in the Archdiocese of Denver, five from the St. Vrain school district and one from the Colorado Springs school district. In addition, three teachers taught in Minnesota, two in New Mexico and one in Georgia.

The teacher's classrooms consisted of: two 2nd-grade classrooms, four 3rd-grade classrooms, three 4th-grade classrooms, and one 5th-grade classroom. Four teachers taught in multi-grade classrooms, two in 1st through 3rd grades and two in 3rd through 5th grades. Two were special education teachers and one was a literacy teacher. This multi-site diverse group allowed me to create a common language in the Brain Gym exercises for the teaching process, which could be understood by teachers in any culture. Admittedly, the diversity of school sites and grade levels makes for a challenging analysis. However, this same diversity also provides a rich context for a case study analysis.

Students

Sixty-three students were chosen to participate in the study, 39 were males, 24 were females, 39 students came from Colorado schools and 24 students from the other states cited. Students' ages ranged from 6 to 11-years-old. The majority of the students, 46 out of 63, were from seven to nine years old. There were almost twice as many males as females (39 vs. 24) selected for the study. Hannaford (1995) discusses the mylenation of the hemispheres occurring later in boys and suggests this may be the reason for increased labeling in boys over girls. Healy (1990) discusses that one third of all American boys meet some of the criteria for hyperactivity.

Data Collection Procedures and Components

The data collection procedure was to organize the accumulated information into a case record using a chronological focus (Patton, 1990). The case record includes several components as outlined in the chart below:

CASE RECORD COMPONENTS

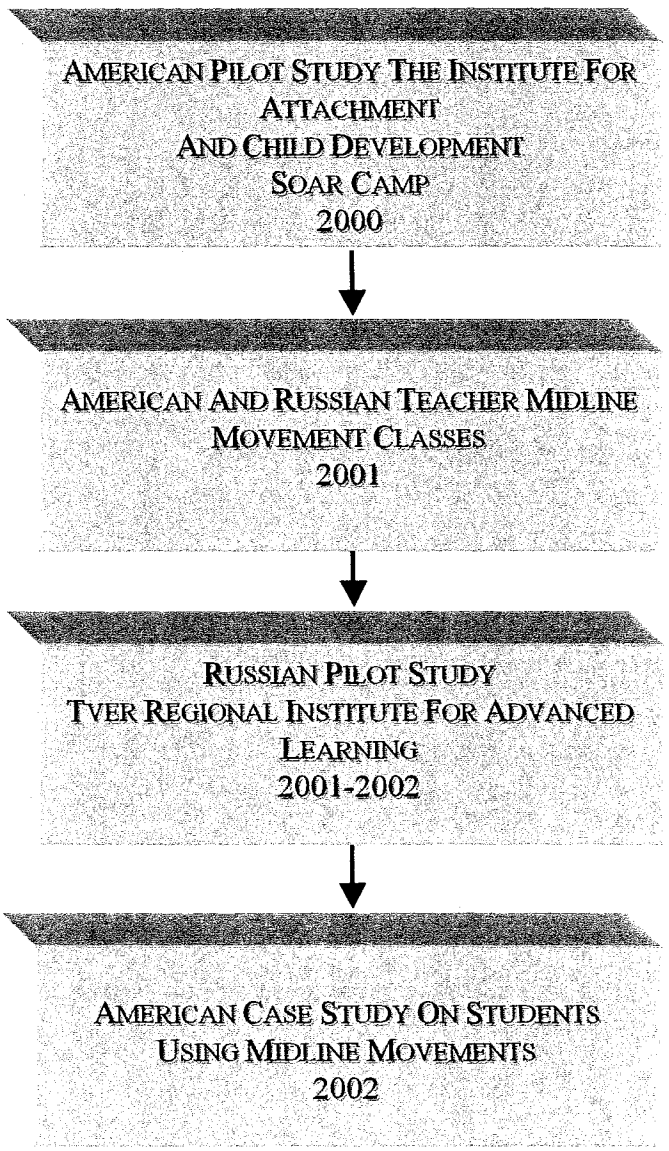


Figure 1

1. The American pilot study with the Institute for Attachment and Child Development (SOAR Camp) in 2000. Data were collected through weekly teacher evaluations forms. Student evaluation forms were also completed with the foster parents, two times during the camp.
2. The Russian and American midline movement classes in 2001 for teachers and their evaluations of personal performance while doing the midline movement exercises. The teachers completed a questionnaire at the conclusion of the class.
3. The development of the student evaluation form based on feedback from the Russian and American teachers who took the midline movement classes.
    a. Teacher revisions to the student evaluation forms. All the teachers who participated in this step took the midline movement classes.
4. Russian pilot study in 2001-2002 with nine teachers and thirty-seven students. Data were collected from weekly student evaluations completed by the teachers. The data were translated from Russian to English and then emailed to researcher.
5. Main American study in 2002 with 16 teachers and 63 students. In this study, American teachers collected information by observing three to five students in their classrooms and using the student evaluation forms for six to eight weeks. Informants in this part of the study are the teachers. The participants are the students whom they have identified as having trouble focusing on their schoolwork or as having Attention Deficit Disorder.
    a. Each teacher completed six to eight weeks of student evaluations and observations in the classroom.

b. Phone observations were gathered from eight teacher interviews, conducted the sixth week of the main study.

c. Focus groups were formed at the end of the study and used to gather evaluative data from the teachers. These group sessions were conducted and tape-recorded in each of the states participating in the study. A series of guided questions were used so that all the teachers responded to the same questions. The tapes were transcribed.

After the main study was completed, all teacher information, observations and student evaluation data were collected and used to examine how the ability to cross the midline affects posture, focus and behavior.

Student Exercise Program

The teachers were asked to instruct the students in the exercises each morning for a period of 10 to 15 minutes for six to eight weeks. The students were instructed to begin the midline movement exercise program with four readiness activities that were identified with the acronym PACE (Positive, Active, Clear and Energetic). Students started PACE by drinking water to support energy needed for the brain. Followed by Brain Gym exercised including Brain Buttons for Clear, Cross Crawl for Active and Hook-Up's for Positive. Each week the students were given a series of three new midline movement exercises, which were chosen from the Teachers Edition of the Brain Gym manual (Dennison & Dennison, 1991). The midline movement exercise program was not cumulative, therefore each week the students only completed PACE and three exercises, one from each of the three dimensions representing posture, focus and behavior.

Below in Figures 2-5 are the "Observation Form" with instructions to the teachers and three pages containing PACE activities and the illustrations of the Brain Gym exercises.

Observation Form

Draft of Observation Form
Midline Crossing Research Project
To Researchers:
Please do the following exercises with students at least once per day or if you are seeing individual classes or students, once in the beginning of the session or lesson. If you have a regular class, please do them in the morning. You are welcome to add them in the afternoon if it works out in your schedule.

1. Begin with the four activities of PACE: Drink water, do Brain Buttons, Cross-crawl and Hookups.

2. Select one exercise from the Brain Gym book as they are listed below from each dimension: **Laterality**: Midline Crossing Movements, **Centering**: Energy Exercises, and **Focus**: Lengthening Exercises.

3. Mark on the form each day for the individual students along with the comments and email or fax it to me at the end of the week :

4. Send or email forms to Joan Spalding 1890 Kerr Gulch Evergreen, Co. 80439 Jlspalding@aol.com Fax # 303-526-7975

WEEKS	Laterality (communication)	Centering (organization)	Focus (comprehension)
1	Double Doodle	Thinking Caps	The Grounder
2,	Lazy Eights	The Energy Yawn	Calf Pump
3,	Alphabet 8's	Earth and Space Buttons	Arm Activation
4,	The Elephant	Balance Buttons	The Owl
5	Neck Rolls	Positive Points	Foot flex
6.	The Rocker	Thinking Caps-Balance B.	Gravity Glider
7.	Belly Breathing	The Energy Yawn	The Grounder –Owl
8.	Energizer	Earth &Space Buttons	FootFlex –Arm Activ.

Figure 2

PACE Illustration

I PACE myself with:

Hook-ups

HOOK-UPS FOR POSITIVE

Activates sensory and motor cortexes in both hemispheres of cerebrum simultaneously. Tongue connects limbic and frontal lobes.

Cross Crawl

CROSS CRAWL FOR ACTIVE

Activates both hemispheres of neocortex simultaneously (motor and sensory cortexes of parietal and frontal lobes). Done slowly, activates vestibular system for balance.

Brain Buttons

BRAIN BUTTONS FOR CLEAR

Buttons are located above carotid arteries, which supply fresh oxygenated blood to the brain, and K-27 points for lung/brain function. Hand on navel brings attention to gravitational center of body (vestibular/RAS/neocortex activation.)

Water

WATER FOR ENERGETIC

Makes up 76% of body weight. Ionizes salt, increasing electrical potential across membranes, essential for protein form and function in nerve nets. Increases oxygen uptake by hemoglobin.

BEGIN AT THE BOTTOM OF THE STAIRS

PACE: A. Increases oxygen amount and flow to the brain. (Though 1/50th of body weight, the brain uses 1/5th of its oxygen.)

B. Increases and balances electrical energy to the neocortex, moving it away from the survival centers in the brain stem. This allows choice by providing access to reason rather than reaction.

C. Increases polarity across cell membranes, for more efficient thought processing and focused attention.

Figure 3

Brain Gym Exercises – Part I

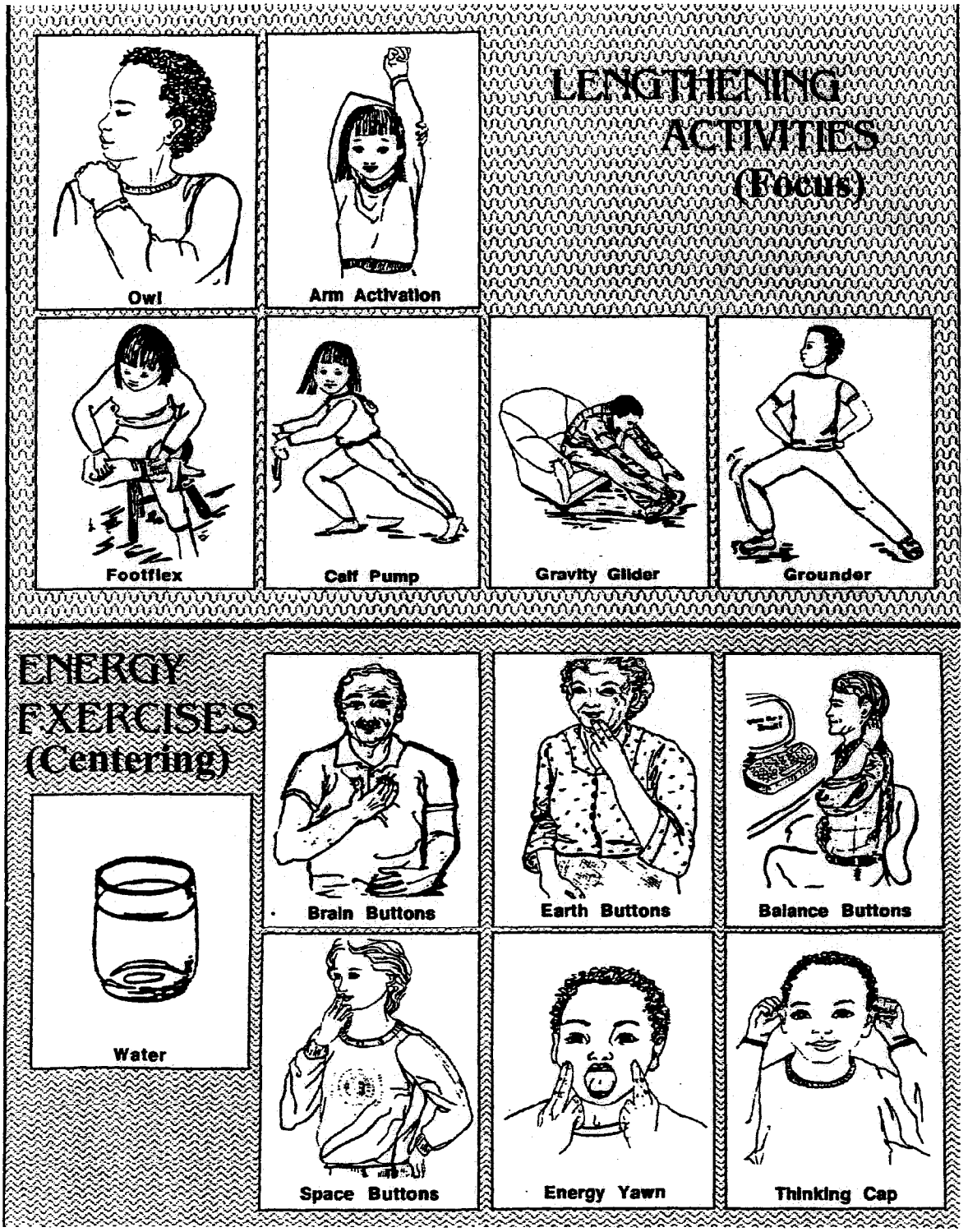


Figure 4

Brain Gym Exercises – Part II

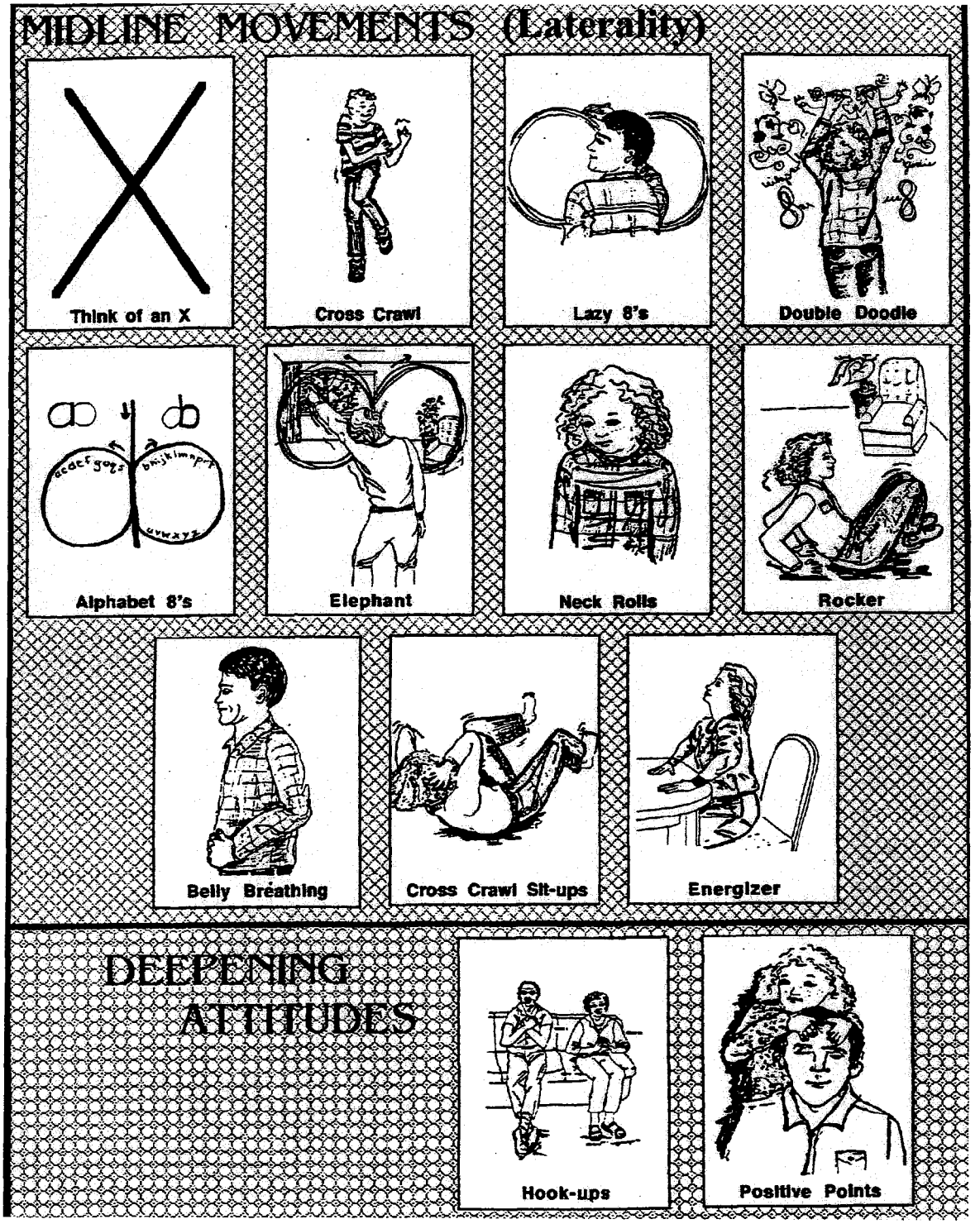


Figure 5

The exercises crossed the midline according to three areas of kinesiology, the side-to-side midline, the top-to-bottom midline, and the back-to-front midline (Tyldesley, 1989). These midlines have been typified in educational kinesiology work as representing three areas of the brain. Side-to-side represents laterality and addresses the frontal lobes. Top-to-bottom represents centering and is involved with the midbrain and the limbic system. Back-to-front represents focus and is connected with the back brain and the frontal lobes (Dennison, 2003).

Student Evaluation Form

The content for the student evaluation form originated by obtaining feedback from four American teachers as they participated in the midline movement classes. Then the draft student evaluation form was submitted to six teachers for their comments and edits. Their feedback was incorporated into the final version of the student evaluation.

During the study, the teachers were instructed to fill out the student evaluation form weekly for each student to indicate changes they noted in focus, posture and behavior. Each category had two lines assigned for different areas of the same category. Teachers indicated on the line, identifying the day of the week, where they thought the student was in terms of their assessment of changes. Posture ability was rated on the line from "no boundaries, can't sit still" at the left end of the line to "moves in a comfortable space," at the right end of the line or scale. The second line in the Posture category was rated from "can't cross midline" on the left to "able to easily cross midline" on the right. Focus was rated from "blank stare or not paying attention" to "relaxed attention," on the first line and "non productive" to "productive" on the second line. Behavior was rated from "un-involved, passive attitude" to "involved, independent work" on the first line and

"inappropriate behavior" to "acts responsibly" on the second line. The same instructions were given to each of the teachers regarding the marking of student changes on the lines. The middle of the line was a medium response and the beginning and the end reflected low and high responses. After each of the lines was a space for teacher comments where they indicated their weekly assessment of the student's progress. Comments were both specific to the categories and general about the students. At the conclusion of the study, the student evaluation data and teacher comments were entered into a Microsoft Excel Student Matrix worksheet where the data were summarized.

See Figures 6 & 7 following below for examples of a blank and completed Student Evaluation Form.

Student Evaluation Form (Blank)

Date_____
Name of student _____ Age_____
Reseacher _____

OBSERVE THREE AREAS : POSTURE, FOCUS AND BEHAVIOR
Mark an x on the line indicating from the lowest on the left to the highest on the right using the day of the week. Each line will have 5 x's identified with the first letter of the day of the week next to each x.
For example:
Posture
xM xT xTh x F xW
No boundaries, can't sit still moves in a comfortable space
Comments as you observe differences you may write them down.

POSTURE

No boundaries
Can't sit still Moves in a comfortable space
comments :

Can't cross midline Able to easily cross midline
Comments:

FOCUS

Blank stare, or not paying attention Relaxed attention
Comments :

Nonproductive Productive
Comments:

BEHAVIOR

Uninvolved , Passive attitude Involved, independent work
Comments

Inappropriate behavior Acts responsibly
Comments

Figure 6

Student Evaluation Form (Completed)

Date Sept. 30 - Oct. 4
Name of student J2A Age 8
Reseacher J2

OBSERVE THREE AREAS : POSTURE, FOCUS AND BEHAVIOR
Mark an x on the line indicating from the lowest on the left to the highest on the right using the day of the week. Each line will have 5 x's identified with the first letter of the day of the week next to each x.

For example:

Posture

xM xT xTh x F xW

No boundaries, can't sit still **moves in a comfortable space**

Comments as you observe differences you may write them down.

POSTURE

xM xT xW xTh xF

No boundaries
Can't sit still Moves in a comfortable space
comments : Monday is often hard for this student. Weekends at home seem to be stressful. This week she seemed to have growing confidence, this seems to relax and calm movement and interaction.

xM, xTh xF xM, xT

Can't cross midline Able to easily cross midline
Comments: Alphabet 8's are very difficult for this student. She is having a hard time relaxing arm muscles. Student is putting out a lot of effort, seems strained. Perhaps too much effort? Reversals are a problem here.

FOCUS

xM xT xW xTh xF

Blank stare, or not paying attention Relaxed attention
Comments : Very focussed this week overall. Of course this is relative to students prior behavior. Still impulsive and active, but just more positive and relaxed.

xM xT xW xTh xF

Nonproductive Productive
Comments: Always a hard worker, but overall positive and confident mood has helped productivity.

BEHAVIOR

xM xT xW xTh xF

Uninvolved , Passive attitude Involved, independent work
Comments This student has been experiencing strong academic growth over the last two weeks. Confidence and self esteem is growing with success.

xM xW xT xTh xF

Inappropriate behavior Acts responsibly
Comments Still lots of conflicts, but as student has become more successful and has received resulting praise, others are becoming more tolerant of behavior.

Figure 7

Student Matrix

The student evaluation data from the teachers were given numerical values for analysis of trends and entered into a Microsoft Excel workbook called the Student Matrix. The teachers graded each student along a scale with subjective marks indicating low, medium or high performance. These marks were given numerical values between one for the lowest and ten for the highest. Low performance measurements were assigned values from one to three; medium performance measurements were assigned values from four to six; and high performance values were from seven to ten. All of the teacher's weekly comments were also captured in a comments section of the Student Matrix for each student so that observations and comments could easily be examined. Each student's Posture, Focus, and Behavior measurements were evaluated and summed weekly and summarized for an eight-week overall performance. Data were then extracted from the worksheet for each area that was examined. See Figures 8-11 following below for examples of the student matrix data workbook.

Student Matrix: Weeks 1-3

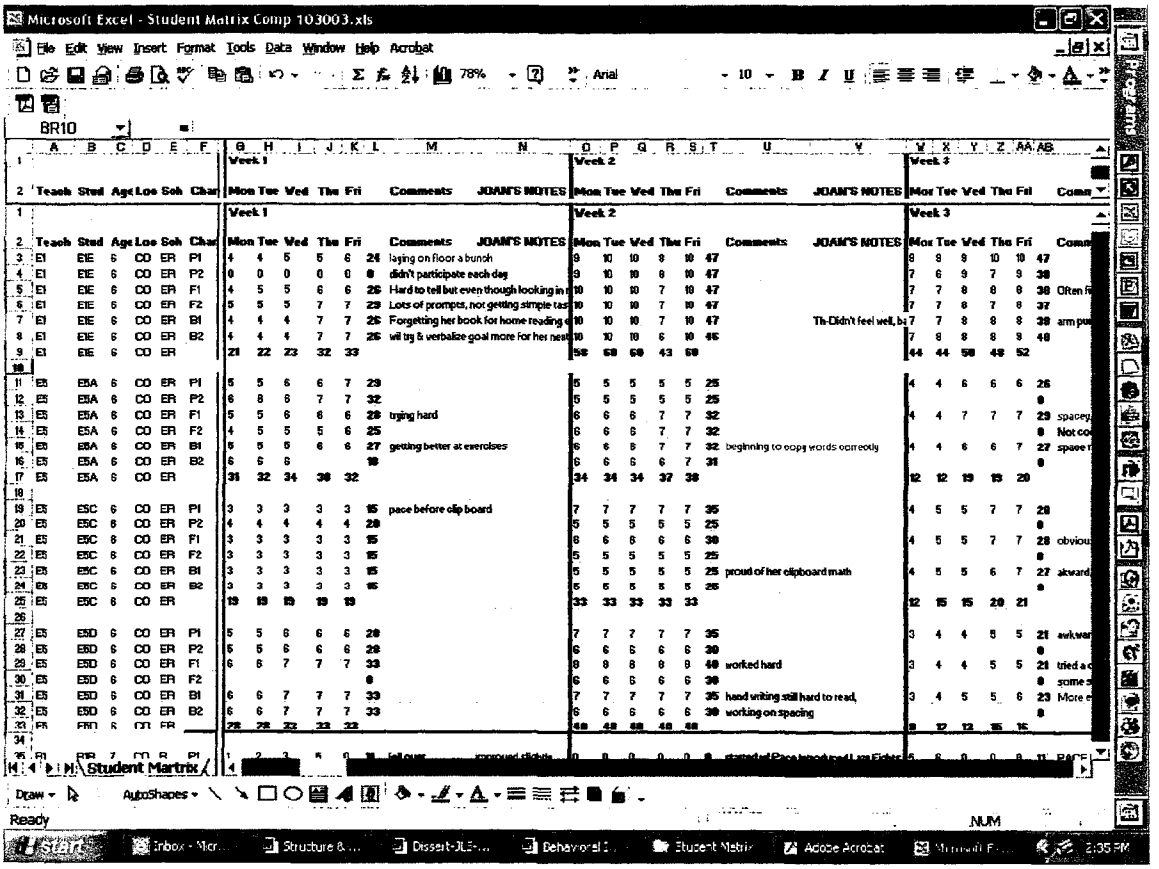


Figure 8

Student Matrix: Weeks 4-6

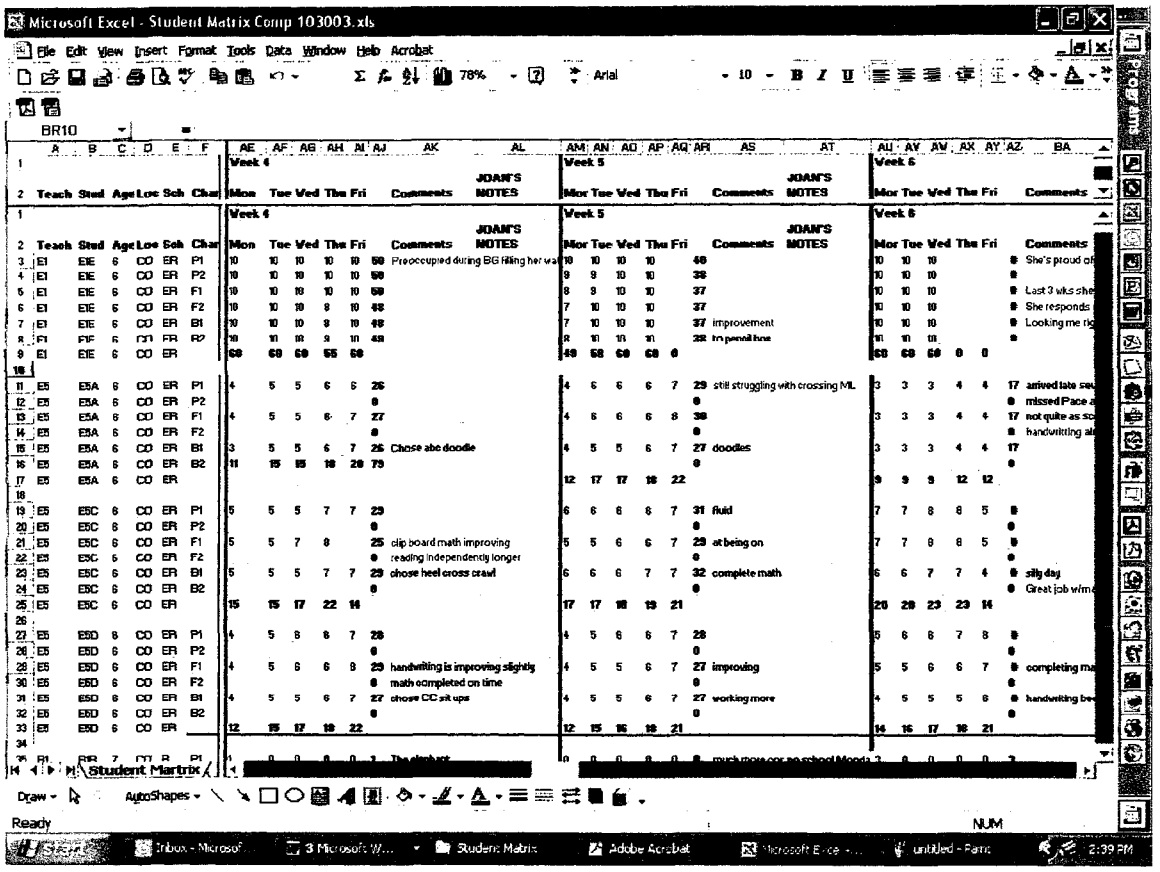


Figure 9

Student Matrix: Weeks 7 & 8

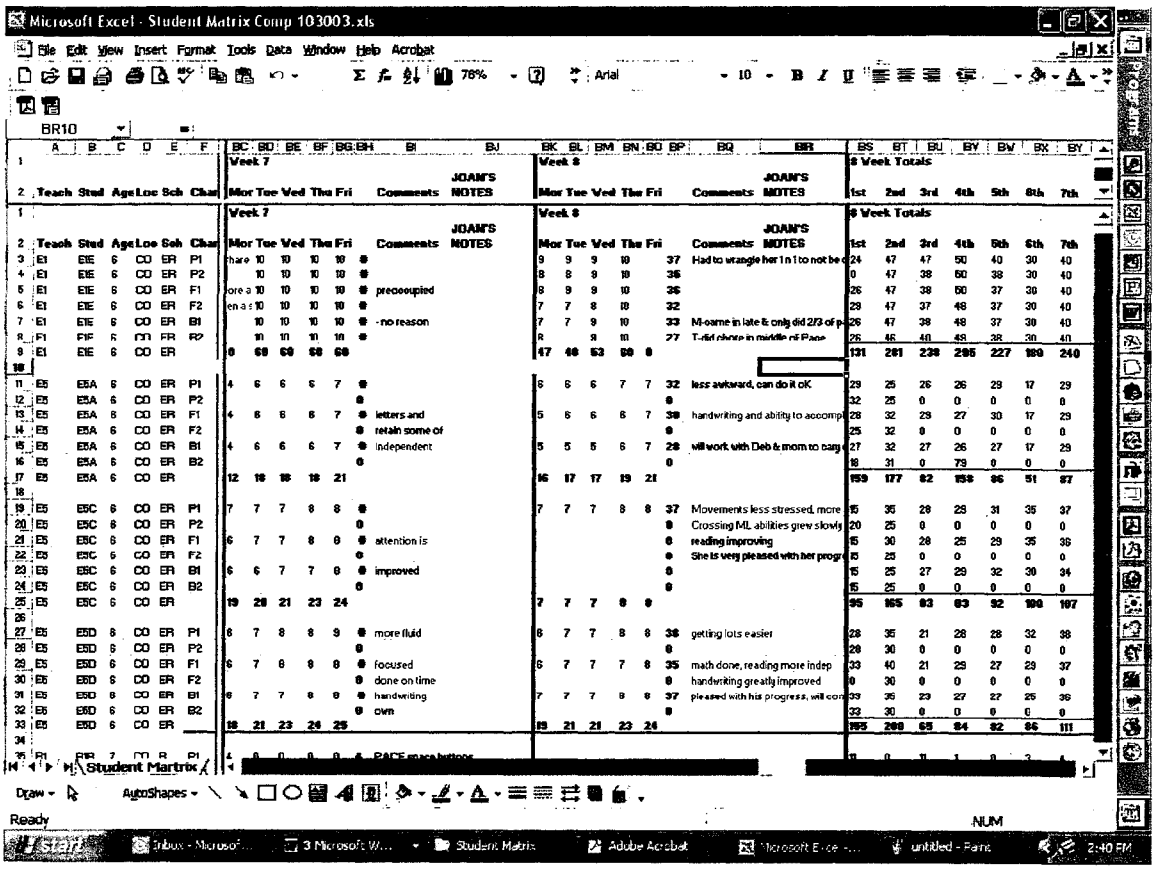
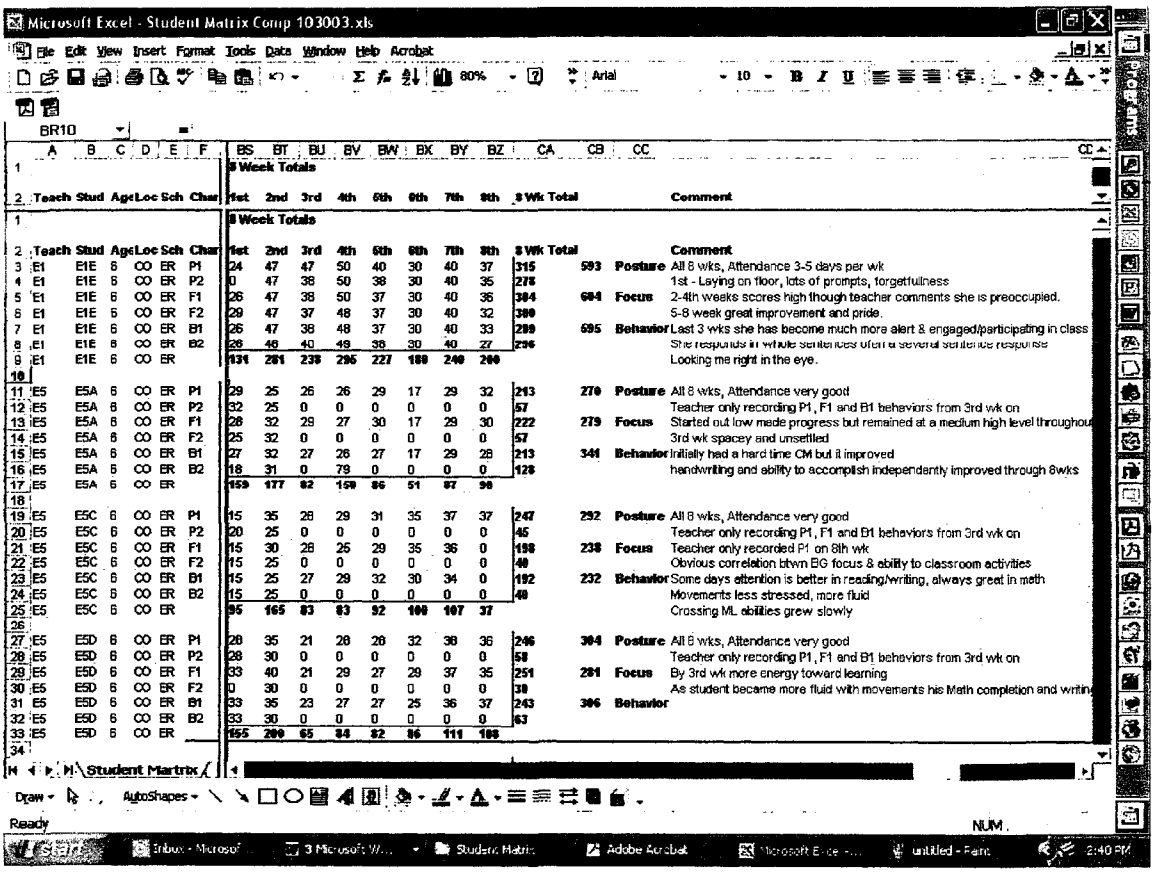


Figure 10

Student Matrix: 8 Week Totals and Comments



Microsoft Excel - Student Matrix Comp 103003.xls

8 Week Totals

Teach	Stud	Age	Loc	Sch	Char	1st	2nd	3rd	4th	5th	6th	7th	8th	8 Wk Total			Comment
E1	E1E	6	CO	ER	P1	24	47	47	50	40	30	40	37	315	593	Posture	All 8 wks, Attendance 3-5 days per wk
E1	E1E	6	CO	ER	P2	0	47	38	50	38	30	40	35	278			1st - Laying on floor, lots of prompts, forgetfulness
E1	E1E	6	CO	ER	F1	26	47	38	50	37	30	40	36	304	694	Focus	2-4th weeks scores high though teacher comments she is preoccupied.
E1	E1E	6	CO	ER	F2	29	47	37	48	37	30	40	32	300			5-8 week great improvement and pride.
E1	E1E	6	CO	ER	B1	26	47	38	48	37	30	40	33	299	695	Behavior	Last 3 wks she has become much more alert & engaged/participating in class
E1	E1E	6	CO	ER	B2	26	46	40	49	36	30	40	27	294			She responds in whole sentences often a several sentence response
E1	E1E	6	CO	ER		131	281	238	296	227	180	240	200				Looking me right in the eye.
E5	E5A	6	CO	ER	P1	29	25	26	26	29	17	29	32	213	270	Posture	All 8 wks, Attendance very good
E5	E5A	6	CO	ER	P2	32	25	0	0	0	0	0	0	57			Teacher only recording P1, F1 and B1 behaviors from 3rd wk on
E5	E5A	6	CO	ER	F1	28	32	29	27	30	17	29	30	222	279	Focus	Started out low made progress but remained at a medium high level throughou
E5	E5A	6	CO	ER	F2	25	32	0	0	0	0	0	0	57			3rd wk spacey and unsettled
E5	E5A	6	CO	ER	B1	27	32	27	26	27	17	29	28	213	341	Behavior	Initially had a hard time CM but it improved
E5	E5A	6	CO	ER	B2	18	31	0	79	0	0	0	0	128			handwriting and ability to accomplish independently improved through 8wks
E5	E5A	6	CO	ER		159	177	82	158	86	51	87	96				
E5	E5C	6	CO	ER	P1	15	35	28	29	31	35	37	37	247	292	Posture	All 8 wks, Attendance very good
E5	E5C	6	CO	ER	P2	20	25	0	0	0	0	0	0	45			Teacher only recording P1, F1 and B1 behaviors from 3rd wk on
E5	E5C	6	CO	ER	F1	15	30	28	25	29	35	36	0	198	238	Focus	Teacher only recorded P1 on 8th wk
E5	E5C	6	CO	ER	F2	15	25	0	0	0	0	0	0	40			Obvious correlation btwn BG focus & ability to classroom activities
E5	E5C	6	CO	ER	B1	15	25	27	29	32	30	34	0	192	232	Behavior	Some days attention is better in reading/writing, always great in math
E5	E5C	6	CO	ER	B2	15	25	0	0	0	0	0	0	40			Movements less stressed, more fluid
E5	E5C	6	CO	ER		95	165	83	83	92	100	107	37				Crossing ML abilities grew slowly
E5	E5D	6	CO	ER	P1	28	35	21	28	28	32	38	36	246	304	Posture	All 8 wks, Attendance very good
E5	E5D	6	CO	ER	P2	28	30	0	0	0	0	0	0	58			Teacher only recording P1, F1 and B1 behaviors from 3rd wk on
E5	E5D	6	CO	ER	F1	33	40	21	29	27	29	37	35	251	281	Focus	By 3rd wk more energy toward learning
E5	E5D	6	CO	ER	F2	0	30	0	0	0	0	0	0	30			As student became more fluid with movements his Math completion and writin
E5	E5D	6	CO	ER	B1	33	35	23	27	27	25	36	37	243	306	Behavior	
E5	E5D	6	CO	ER	B2	33	30	0	0	0	0	0	0	63			
E5	E5D	6	CO	ER		155	200	65	84	82	86	111	108				

Figure 11

The eight-week totals and teacher comments provided a summary at-a-glance of each student's participation during the study.

Student Matrix Charts

In reviewing the student evaluation data, I discovered several areas that I could study more closely and directly relate to emerging themes. Those areas of analysis included:

1. The students' "Best Day of the Week for Performance" chart indicates on which day of the week the students had their best performance. It was created by:

- Examining all 63 students to determine their best day of the week for performance for all the three categories.
- The best day of the week for each week was highlighted in the Student Matrix. Then the best day for each of the eight weeks was selected.
    - The results for the best day in each of the eight weeks were summed based on frequency of occurrence and converted to a percentage.

2. The "Best Week of Performance for Students" chart illustrates the best week of performance for the students during their eight-week participation in the study. It was created by:
    - Comparing the results for all 63 students.
    - Each student's best week of performance was highlighted in the Student Matrix during his or her participation in the study.
    - Then each weeks results were added up and given a percentage.
3. The "Average Age of Performance" chart summarizes all 63 students average performance by age in each of the Brain Gym exercise categories on the Student Evaluation: Posture, Focus, and Behavior. It was created by:
    - Grouping the students data by age.
    - Totaling performance measurements by age group for Posture, Focus and Behavior.
    - The sums by age for Posture, Focus and Behavior were then divided by the number of students in each age group to obtain average scores.
4. The three "Weekly Performance During Study" charts examined how each student performed weekly during their eight-week participation in the study. I compared age

groups: 6 and 7-year-olds, 8 and 9-year-olds and 10 and 11-year-olds. This chart was created by:

- Selecting a group of 29 students who participated in the study using the following criteria:
  - The students had to complete all eight weeks of the study, and
  - Their teachers had to use consistent recording on the Student Evaluation forms.
- The 29 students were then grouped by age.
- Each student's weekly performance in all the exercises were totaled and logged into the Student Matrix.
- Then each age group's results were charted over the eight weeks of the study.

5. The three "Posture, Focus and Behavior Performance" charts were grouped by age and illustrate student performance over the eight-week period of the study. These charts were created by:
   - Selecting a group of 29 students who participated in the study using the following criteria:
     - The students had to complete all eight weeks of the study, and
     - Their teachers had to use consistent recording on the Student Evaluation forms.
   - The 29 students were then grouped by age.
   - Each student's weekly performance in all the three exercises were totaled for eight weeks and logged into the Student Matrix.

- Then each age group's scores were totaled and the results were charted so that the viewer could see their Posture, Focus and Behavior measurements.

6. The "Overall Student Performance" chart illustrates how the 63 students performed throughout their participation in the study. It was calculated by:
   - Totaling each student's data measurements in the Student Matrix for Posture, Focus and Behavior for the duration of the study.
   - Comparing the teacher comments to the weekly totals to determine if the student improved or not.
   - Each student was marked to indicate no improvement, dropped in performance, had varied improvement or improved significantly.
   - All 63 students were analyzed in the same fashion and the resulting data were entered into the chart.
7. The "Attendance" chart was created to summarize the 63 students attendance during the eight weeks of the study. It was created by:
   - Creating a new column in the Student Matrix for documenting how many weeks each student completed.
   - The number of weeks each student completed was entered into the matrix.
   - The attendance data was then sorted by number of weeks completed to examine the results for all 63 students.
   - The results were added up and given a percentage.

The data, charts, tables and summaries of these emergent themes are outlined in Chapter 8.

Fieldwork

Fieldwork was conducted among the teachers before, during and after the initial eight-week study by means of questionnaires, telephone interviews, emails, observation forms and focus groups (Krueger & Casey, 2000). Prior to the study, teachers completed student descriptions, questionnaires and school summaries. In focus groups after the study, teachers completed questionnaires that summarized their experiences during the study. The questionnaire is illustrated below.

Focus Group Questions

1. Which students did you pick and why?
2. How do you understand the midline in relation to learning?
3. What were your concerns in doing the midline crossing exercises?
4. What did you notice about different days of the week in relation to doing the exercises?
5. How did the environment affect the ability to cross the midline?
6. What did you notice about physical posture and the midline?
7. How did you fine-tune the noticing of the crossing of the midline?
8. How do the children demonstrate the term silly? A teacher reported the children believed the exercises were silly.
9. What exercises seemed difficult to cross the midline?
10. What changes did you notice in the entire class when the exercises were done?
11. What factors prevented you from doing the midline movement s?
12. What negative things did not work during observations? What were the characteristics of focus that you observed?

13. What did you notice about your self when you did the exercises?

14. How did the observation forms work for you?

15. How will you use the information from the study to assist the students?

Other Methods

Other methods of data collection were also used for this study. Those methods include:

- Audiotapes were used after the American study in the focus groups to record the teacher comments. The mentors in the focus groups followed the same questioning form and all the answers were recorded. These tapes were then analyzed and summarized on a paper record.
- Questionnaires were completed by the American teachers taking the midline movement classes.
- Emails were used to send information back and forth to teachers throughout the studies.
- Field Notes included weekly information gathered and observations conducted during the classes and studies.

Data Analysis

While many models were considered, I chose case study as the mode of analysis. In understanding the case record through questionnaires, teacher interviews, evaluation forms and focus groups, I looked for patterns that created more understanding about using midline movements in the classroom. I brought together all the information to emphasize emergent themes.

Because of multiple information sources this study brings the reader into classroom situations both in America and in Russia. The pilot studies, the descriptions, and observations of the students by the teachers and the focus groups provide a rich background that allows the reader to generalize from this study to their own situations.

As mentioned previously, Cresswell (1994), Miles and Huberman (1994), Mirriam (1998) and Patton (1990) discuss the importance of doing the analysis while conducting the study. Information gathered from the teachers who took the midline movement class was used to create the initial student evaluation form. Simultaneous analysis in this study occurred when phone observations were conducted with the teachers throughout the study. Comments and observations, from the main study teachers, were used to develop the focus group questions.

Analysis Tools and Techniques

In the American pilot study with the Institute for Attachment and Child Development, I used the following analysis techniques:

- Physical Movement Assessments.
- Personal evaluation assessments including behavioral procedures, teacher discussions, parent evaluations, and goal setting.

In the midline movement classes the analysis technique was a series of open-ended questions that were given to teachers in the United States and Russia. I asked the teachers to comment on their reactions to doing the movement activities for themselves while taking the class. Other questions on the questionnaire are related to demographics of the classroom and to the teachers' impressions of children who persist in their work and those

who don't. The questionnaires from the teachers were gathered at the end of class and were coded for emergent themes. This coding was accomplished by responses to the directive, "Describe your experience using the midline movements, i.e., the Brain Gym exercises for yourself." Comments from each teacher were written down verbatim. I then coded the teacher's comments regarding the qualities of children who persist and those who have problems. These comments were divided into four categories: school skills, emotions, body awareness, and actions. From these categories, I looked for patterns and emerging themes and used this information to write a descriptive narrative about the process.

In the Russian pilot study analysis I used the teachers observations about students ability to focus on academics, their postural problems and behavioral concerns. I provided teachers with a general direction for the development of their student observation form. They then took this form and modified it to fit their cultural and classroom needs. These student observation forms were then translated into English for my analysis.

In the American case study, analyses were conducted on the student matrix information gathered from the student evaluations, teacher observations, school demographics and focus group comments.

I used a cross case analysis and looked for "processes and outcomes that occur across many cases, to understand how they are qualified by local conditions and thus develop more sophisticated descriptions and powerful explanations" (Miles & Huberman, 1994, p. 172).

The findings emerging from the experiences the teachers had while doing the classes, pilot studies and main study were qualitative in that they were grounded in direct program experience not imposed by previous hypothesis (Patton, 1984).

Validity and Reliability of Measures

In an emergent qualitative design, Cresswell (1994) advised the process of developing "verification steps" to establish validity or reliability of the data. Triangulation is one step and involves the process by which information can be converged with other sources, different investigators or different methods of data collection. Another step is to do member checks, taking the information back to the informants and asking if it is correct. And a third step is to identify how the informants and participants would be involved in all phases of the research.

In this study triangulation occurred through using the data from the focus groups in three different areas of the United States and crosschecking the results. The teachers who participated in the focus groups were also the teachers who participated in the study. The mentors during the study were leaders of the focus groups and each focus group used the same set of questions for discussion. The discussions were taped and the findings summarized.

The verification process used member checks and involved the informants in the process of the research (Cresswell, 1994; Miles & Huberman, 1994; Mirriam, 1994). Member checks were used while developing the evaluation form; meetings were held with teachers who took the midline movement classes to look at the framework for the evaluation. These informants were teachers who took the classes but were not necessarily

part of the study. Teachers chose words for the evaluation form that more clearly described the situations they experienced in the classroom. Before the study began, meetings were held with the participating teachers to clarify the questions, the use of the evaluation form and to receive feedback about challenges that might occur while doing the research. During the study, I used weekly e-mails and telephone conversations to answer questions about the completion of the student evaluations and to support the teachers in the process. This also served to provide me with feedback about the changes they were observing in the children. As the teachers collected the data it was sent to me by mail, fax or e-mail. If I had any questions, I was able to call the teachers or use email to clarify.

Generalizability refers to the external validity of the research. What teachers and students understand about the change or non-change in their abilities of this particular group of students may be generalized to other classrooms of the same age students in different countries. Stake (1995) contends that case study allows us to look at a particular case and understand its uniqueness and what makes it different from others. Using specific movements to help integrate the brain is an atypical solution to learning problems but the findings of these teachers may be generalized to other teachers in other classrooms, particularly since there is such a diverse group of students and classrooms represented. By being a multi-site and multi-case study, the external validity and generalizability can be increased (Mirriam, 1998).

Trustworthiness or authenticity, which Patton (1990), Cresswell (1994), Mirriam (1998), Miles and Huberman (1994) discuss as a measure of validity and reliability, was addressed by an audit trail of: audiotapes, transcriptions, evaluation forms, coding created during the data reduction phase, field notes, and e-mail memos.

Many times within a study that discusses improvement as a result of treatment, the Hawthorne Effect may exist because of paying attention to students. However, I believe this effect was reduced primarily because of the different types of schools, different kinds of classrooms and teachers, variation in age groups and the different socio economic backgrounds of the students.

Researcher Perspective

In this study, one of the most critical areas is the maintenance of an ethical standard while collecting data. Patton (1990) cautions against wanting to change people. In the years I have worked with teachers and with individuals, I have learned that while I am a facilitator of the information, the data that emerges from the process must truly be from the people with whom I am working and not evoked by me.

As I teach in different cultural environments, I am amazed by the similarities in challenges teachers face daily in the classroom. As an observer, I have watched people get in touch with the brain –body connection through doing specific midline movements.

In the analysis of the data as a participant observer and particularly since I have been part of the group that has taught the midline exercises, it is important that I am continually aware of being non-biased, accurate and honest in reporting the data.

Critics may ask how I can be an unbiased researcher because I am a teacher in this field. I don't think I can ever be completely nonbiased because of my involvement in this area of research and because I have specific questions to which I am seeking answers. These two situations could present a bias even though I worked diligently not to let them influence my observations of the data.

CHAPTER 4: AMERICAN PILOT STUDY – THE INSTITUTE FOR ATTACHMENT AND CHILD DEVELOPMENT (SOAR CAMP), 2000

I developed a pilot study in 2000 working with The Institute for Attachment and Child Development. In the pilot study, we looked at the use of contralateral movement activities to help students with learning challenges that also had a myriad of emotional disorders. The study was conducted for 10 weeks during the summer with clients from the Institute in Evergreen, Colorado. This study was implemented to understand the process of using Brain Gym in exploring perceptual development within the theory of the Multiple Intelligences as advanced by Dr. Howard Gardner of Harvard University.

Students Organizing And Reaching Goals (S.O.A.R.) included nine clients: four girls and give boys, ranging from 7 to 14 in age. One half of the group was judged to have attention deficit disorder and/or be bi-polar. The rest had labels such as oppositional defiant and fetal alcohol syndrome. All were diagnosed as Attachment Reactive Disorder.

Using the principles of symbolic interaction as first advanced by Herbert Mead (1934) and Herbert Blumer (1969), i.e., that people would create meanings through their interactions and then these meanings become reality, I thought it was important to have discussion groups before the start of the camp. My purpose in forming the three discussion groups was to understand what people expected from the program and then, to include these expectations within the framework of the objectives set for the daily activities.

The first meeting included the director of the Institute and myself. Subsequently, we met with the parent coordinator who was to be the daily link to the Center. Together

we went over the program, set the daily schedule and designed the behavioral strategies. When the program was approved, I met with the teachers and then the teachers and I met with staff from the Institute to have a briefing on the children and to finalize the daily program. Finally, I met with the foster parents and the staff from the Center. Parents were asked to be aware of the expectations, i.e., what they would be responsible for doing during the process of the camp. We would ask them to fill out evaluation sheets periodically, to work with the students during the week to reinforce the exercises and to make sure that getting their children to the camp was a priority once a week for the 10-week period. In each of these meetings we further refined the program according to what each person felt was important to the principles of the Institute, and how these principles would mesh with ideas we had about the objectives of the S.O.A.R. program. People invested in the program were able to voice their suggestions.

Assessment of Physical Movement - Persistence Games

Assessment, as defined by Howard Gardner should be an apprentice model, which assesses "contextualized learning" (Gardner, 1993, p. 163). Individuals are assessed while they perform the skill of a particular craft. The learning naturally occurs and may include subjective factors such as the teacher's relationship with the student. It may also bring up the need for other kinds of services.

One week before the camp began, I met with each child individually and used a variety of assessments to deepen my knowledge of each child in two areas: First, in the ability to cross the midline, to read, to listen with both ears and to write easily; and

second, in the ability to persist in a variety of games that were developed by Dr. George Morgan and other staff members at Colorado State University.

To encourage the students to feel comfortable with me, I told them about 4 ways that they could make it easier to learn. I invited them to have a glass of water and we discussed how the brain makes connections. I used the man in the desert mirage story to illustrate how we do not think clearly if we do not have enough hydration. I then taught them three integrative exercises that were designed to effect the following areas: "Brain Buttons" to stimulate the blood flow to the brain; "Cross Crawl" to create physical awareness of the left side of the brain working with the right side of the body and visa versa; and "Hook Ups," an exercise to relax the body with special breathing techniques and posture (Dennison, 1995).

Movement Assessment

In this assessment I asked the student to notice on which side it felt easier to cross over the middle of the body and on which side it was more difficult. I noticed some of the children could not cross over but did a homolateral, one-sided puppet movement. This is normal before you are five years old but it should change as bilateral hemispheric brain develops. For example, although he was 14 years old, Jacob felt sick when he tried to cross over from one side to the other. When he did his writing sample, his fist was clenched; he shook and said he felt very uncomfortable.

Another assessment was administered by having the students notice in which ear they heard melody, numbers and sequences. Some were able to do this successfully. Derek, a 14-year-old boy who was very athletic, felt both ears were working well for all of

the items. When reading, they were asked to notice which parts of the page were comfortable when they looked to the top, bottom and both sides.

In doing the writing exercise, I had them write, My Name is _____ and I like to _____. This allowed me to see their ease in writing, how they held their pen, and the appearance of their writing. I then taught them how to do the "Lazy Eight" for ease of tracking and releasing the tension in their arms. Then I asked them to write again and observed the difference. By introducing them to one of the exercises, they could see a sample of how the exercises would help them. Jacob was able to release some of the tension he felt while writing. This sequence of activities took approximately one-half hour. It was a time in which we could talk easily back and forth and get to know each other. It was important for me to write down their comments verbatim and to describe the situation while we did these exercises.

As part of the individual evaluations I introduced games provided by Dr. George Morgan to obtain Mastery Motivation scores. The games were employed to check persistence, i.e., how long would they stay with a game; and to check pleasure, i.e., what were their feelings while doing the game.

I told them they would have a certain amount of time for each task and used a stop watch to indicate stop and go. In addition, I wrote down the comments about the games of each child as they were doing them. Instructions for discussing the games were provided by Sharon Bartholomew and George Morgan.

Direct Observation

Coping skills are assimilated when the child is involved in his or her own treatment program (Gallager & Kirk 1989; Quinn, 1990). Self-assessment in the camp was of

particular importance. Because of previous abuse issues encountered by some students, it was important that they be able to vent their feelings in a safe way.

In order to measure change in the children and their behaviors, I also used direct observation, one of the techniques suggested for children with learning and behavioral problems (Hammil & Bartel, 1986). By having personal and group observation sessions each day, we were able to monitor personal change and group dynamics.

For example, Jacob, a 13 year-old boy, at the beginning of the camp chose a spot for his personal place away from the rest of the group, almost at the end of the designated area for the camp. When he spoke in the group circle, he stuttered, and held his chest in a closed posture. Though his ideas were intelligent and analytical, the children interrupted him and made fun of his ideas and neglected him in conversations. After the end of the second week, he asked to move his special place closer in to the center of camp activities. Because of his renewed participation in group activities and our goals of emphasizing strengths and potentials of intelligence, by the end of the camp he was a leader in the group. I noticed his motor skills had improved, his chest area did not look closed down and his ability to cross the midline in the exercises was noticeable.

Personal Evaluation

Another technique we used was observational recording (Hammel & Bartel, 1986). During the day, after each activity, we did personal evaluations in a group. Using feeling words, "I understand," or finishing the sentence statement, "When I was doing the new exercises today I..." or by asking specific questions such as "What did you do today that will help you next week," we were able to involve each participant in the discussion.

At the end of the day each student also received a paper and pencil evaluation form, which they completed at their personal quiet spot. If they had trouble writing, as one of the 7-year olds did, a counselor helped them out. These forms were then brought back to the circle and discussed in the group in relation to the goals we set in the morning.

Behavioral Procedures

If the teacher felt the student was not relating to the group experience the experience was closely monitored. The parent-child coordinator would take the child under advisement and, using specific tools developed for Attachment Disorder, assess the child further.

Teacher Discussion

At the end of each session, the language arts teacher, the arts and craft teacher, the parent coordinator, the parent volunteer and I completed a written evaluation of the day's activities. I then discussed each student's work progress on a weekly basis with the parent coordinator. During the course of the camp, I also had several sessions with each of the teachers individually. These evaluations helped us adjust the curriculum and the behavior model as needed.

Parent Evaluation

Foster parents and parents were probably the biggest concern in the camp. Since the children came from many different areas in the city, parents had trouble getting them to the Institute for transportation to the camp. Since the camp was being paid for by the Center, they also didn't have any financial investment in the camp. After the first three

weeks, I sent home a parent evaluation form and found that the answers I received were sparse. The answers did not reflect a lot of involvement on the part of the foster parents.

Setting Goals

Setting goals is an important part of the five-step balance process used in Educational Kinesiology (Dennison, 1989). Using this model we began each camp session with a discussion of the intelligence potential we were looking for that week. We also did experiential exercises around the developmental stages of the intelligence. We were concerned with understanding the big picture about intelligence, what was relevant to each student, personally, and how would they express themselves in front of the group by either drawing their goal or writing it on the dry-erase board. At the end of each day, we then looked at the goal and asked how it made them feel.

Visuals

Children with Attachment Disorder need a strong sense of structure in their lives (Levy & Orlans, 1995) and rituals (Hage, 1995). During the camp we created the structure by having programs that followed a specific routine each day. When the participants would come to the camp they would recognize many visuals that were constant throughout the entire program. Some of the other visual constants used were banners, photo posters, and a video camera.

In developing the structure of the camp, we decided to have a banner hanging between the trees over the cable spool table where we did our craft work, snacks and lunches. The banner was hand-lettered and said, "Welcome S.O.A.R. Campers," with numerous balloons on each side and with crepe paper in various colors. This was strung

up before each camp. Also, long white cloth streamers marked the outside perimeter of the camp so the students had physical boundaries.

During each camp session we used a Polaroid camera during the day to record the activities of the camp. As the campers grew more used to their structure, they wanted to take some of the pictures, which they were allowed to do.

At the end of each camp day, after the evaluations, campers would choose a picture from the photos taken that day and place them on a large dry erase board creating a photo poster. The campers would then write a word or sentence by the photo, which represented their feelings or what they learned that day.

We used a video camera to develop the end of year program for the students. The children wrote the script, designed the puppets, and presented it to their families and the staff. After performing her skit one of the students asked to use the video camera. She then walked around the camp videotaping the camp environment, discussing what each thing represented, and how she felt about it. At the beginning of camp she was very quiet and shy. She had a chip on her shoulder and was not really interested in participating. After the camp she was much more involved and interactive and was able to graduate from the Institute of Attachment and Child Development program.

Physical Environment

The outdoor physical environment included the representation of a generic Indian village. It consisted of a forested area covered with large pine trees, rock out-croppings and meadows. The Indian symbols used in the environment were a medicine wheel, a Sioux tepee, a campsite and a special place.

The medicine wheel consisted of a thick rope that made a 30 ft. diameter circle. It was painted in the colors of the medicine wheel values: white for wisdom and the white buffalo, yellow for illumination and the eagle, green for the heart and the mouse, and black for the bear and introspection. This circle was used for introducing activities and for day-end evaluations.

In the middle of the circle was a large drum made from an elk hide and a large tree. Beside the drum was a mallet made from a tree root. The drum and the tree root were used for bringing the people into the circle. Each child wanted to be the one who pounded the drum. In addition, there was an elk horn tied with feathers lying next to the drum. It was a designated talking stick and the children passed it when they wanted to say something to each other in the circle.

A large 18 ft. Sioux teepee was the gathering place on cold or rainy days and for the language arts component of the camp. Children sat on mats or fur hides. This was quite a change for city kids to see animal hides hanging in the teepee. Some wanted to touch them while others said, "Yuk."

The campsite was located near the welcoming banner and consisted of large wire spool tables covered with dark green vinyl placed in a circle with chairs around them. Nearby was a rock fire pit with 'sitting' logs placed in a circle around it. This site was used to introduce the day, for art activities, and for lunch and snacks.

Children chose a special tree or rock out cropping to be their "special place." They marked it with a colored ribbon and whenever they wanted quiet time or did introspective writing they could go away from the group and be by themselves. For this

group of students, this space was within visual range of all the other campers and the teacher, so the behavioral structure of the Institute was maintained.

Conceptual Framework

Self Determinism

A young person in adolescence typically strives for independence, assertion of personal identity, and new responsibilities. This developmental period involves additional challenges when barriers are imposed by society and families (Powers, 1996). Youth with disabilities and those diagnosed with Reactive Attachment Disorder cannot pass through these stages until they have been able to reconcile previous stages successfully. The purpose in choosing to parallel the theory of Multiple Intelligences, (Armstrong, 1994; & Gardner, 1993) with the developmental structure of Visioncircles (Dennison, 1997) was to explore the use of each of the intelligences as a child progresses through the early developmental growth stages.

Each of the eight Visioncircles has its parallel within the eight intelligences (Dennison, 1993). Integrative exercises built into experiential activities around the theme of the intelligences allowed us to work through each developmental stage in a non-invasive, playful way. Each week built on the previous week's activities and at the end each child had a reservoir of skills they had completed. This helped them to look at their strengths and recognize how he or she could access those strengths through the integrative exercises.

One of our objectives in the program was to assess the changes we were seeing, both positive and negative, in the student's ability to persist in a task. In the beginning of

the program, whenever we would challenge them through the experiential activities in the intelligence and the developmental Visioncircle, many would want to quit, saying it was "too hard" or "I don't want to do it". They would act out in such a way that the Institute coordinator would withdraw them from the activity. Since we were looking at persistence, it was also interesting to see how the ability to attend to a task was also a measure of resiliency.

According to various studies, when under stress resiliency is less in children with Attachment Disorder (Levy & Orlans, 1995). Records kept by attachment therapists include the following behaviors.

"These children will show antisocial and aggressive acting out behaviors. They are self-destructive, use self-mutilation and are cruel and often kill animals. Because they have no access to cause and effect thinking, they cannot implement areas of self determinism such as being in charge of decisions about their behavior" (Cline, 1995, p. 73).

Recent trends in self-determinism suggest that youth assume major roles in decision-making and in cooperating with other youth in designing their educational services while they are in academic situations. However, special education does not typically emphasize youth empowerment or partnership (Powers, 1996).

In the camp we used a very structured program, but encouraged lots of feedback during the day with children both individually and in a group. Foster Cline, a child psychologist, identified it as a structure like a steel box with a velvet lining (Cline, 1995).

Some of the antecedents of Self Determinism (Powers, 1996) are described in the Institute literature as typical for children with this diagnosis. Associated with poor

problem solving skills, learned helplessness is contrasted to the mastery motivation model as proposed by Harter (1981), in which we understand how students will have confidence in staying with a task.

As defined by Harter and Morgan (1997), Mastery Motivation is achieved through multiple efforts along with encouragement for success. By encouraging goals of self-determinism as well as mastery success, we had children continually set goals related to various activities, the intelligence potential and the developmental cycles in the Vision Circles we were exploring.

Before each activity the students were also taught relaxation exercises that involved centering the body through posture and breath (Dennison, 1991).

Powers and Bandera (1996) found experiences that encourage self-efficacy, would promote skills such as relaxation and positive self-talk. These skills could then be used to increase motor performance and reduce negative feelings.

In the S.O.A.R. program our objectives were to constantly talk to the students about the daily objectives, how they were met, and what their feelings were in meeting these objectives. By setting short-term daily goals, i.e. "what do I want to happen today" in relation to the developmental skills we were exploring, I believe we fulfilled their need to see positive results.

Rak and Patterson (1996) describe resiliency concept as the ability or power to return to the original form after being stretched or compressed, or to have the ability to recover from an illness or adversity or the like. Some of the resiliency factors we looked at in the camp were self-understanding, self-concept, and confidence or faith in the future.

In their publications, Rak and Patterson also cited work by Beardslee and Poderefsky who found that resilient children were able to achieve measures of self-understanding in spite of the fact that their parents had major affective disorders. These children had feelings that things will work out and that odds could be surmounted. They were able to enhance their self-concept by being required to carry out tasks that helped others in their community. Accordingly, Rak and Patterson advised counselors to develop realistic approaches to enhancing self-concept that focused on building transferable skills. As we ourselves evaluated each activity with the students, we continually focused on ways to increase self-understanding.

For example, in one of the art activities about interpersonal intelligence, (the ability to understand what our strength is when we look within ourselves), eleven year old Tammy drew a picture of her heart on her hand. The lesson focused on drawing emotions for different kinds of music. Large pieces of paper and pastels were the medium and rock; classical, earth sounds, popular and jazz music were the different sounds. After going through several renditions with different music, Tammy held up a picture of her hand with a bright red heart on the palm. She explained to the group, "I always wanted to have my heart hidden, because I would always get hurt but now I think I can talk about my feelings without being afraid."

Inclusion

A basic belief of modern education is that inclusion and participation are essential to human dignity and the exercise of human rights. In integrated classrooms, strategies are developed so all students may participate fully in the educational process (Lipsky & Gartner, 1996). Some of the questions asked by educators confirm the need to change

practices and allow all students to participate in the classroom. Reflecting on the bell curve, Robert Sternberg (1994) notes that it was not the original intention of Alfred Binet to relegate students to special classrooms because they were mentally handicapped or had behavior problems (Lipsky & Gartner, 1996).

By looking at the strengths perspective and identifying the potentials of intelligence within each child, I believe that each student can contribute to the classroom regardless of the labels imposed by society. Accordingly, I use the concept of intelligence potentials as advocated by Gardner (1996). In the S.O.A.R camp we were also following the principals of inclusion as quantified by Lipsky and Gartner in their article, The Remaking of America

Results - SOAR Camp

Paula Pickle, former Director of the Institute of Attachment and Child Development, made the following comments about the camp experience, "It was a good bonding experience for the children and the leaders, offering an opportunity to the children to be known in a different way. It asked them to stretch beyond themselves – a difficult task for these children. The cross pattern movement was very beneficial and the results were visible. It helped one child calm herself. It helped another child assume more of a leadership role with confidence, whereas before, he had been more of a non-compliant child, attempting to distract other's attention. It helped another child feel more a part of the group as a whole, whereas he had been isolating himself from the others. I think it gave these children a sense of themselves and themselves in relation to the environment that had been missing. The exercises enhanced confidence, teamwork, coordination, body image, sense of self, and thoughtful consideration of the world around them. It gave them

an opportunity to experience success in the context of group relationships. These are all positive experiences that were gained by camp participants. They were free to explore in this safe environment, knowing there was love, support and encouragement."

Summary

Physical difficulty in crossing the midline was apparent in 5 out of 9 students at the beginning of the study. At the end of the study, all could cross the midline without difficulty while doing the exercises. The writing and art teachers noted changes in the ability to focus. In art projects, the students were able to carry out instructions as a group and individually.

Because of emotional trauma, children judged to have Attachment Reactive Disorder can not bond and are diagnosed with multiple personality disorders and physical problems. The children from The Institute for Attachment and Child Development (SOAR Camp) were able to surmount their mental challenges and participate in an outdoor experiential program where movement exercises were an inherent part of the art, writing and outdoor activities. At the end of a 10-week camp, which midline movement exercises were an important component of the program, all participants could cross the midline with ease. Behavior changed, emotional issues were resolved, bonding experiences occurred and the students were able to cooperate to produce a skit, which personified these emotional issues. I thought the experiential activities combined with the midline movements helped free the students from their previously observed behaviors before the camp began.

In reflecting on this program I was left with the following questions:

a) How did the midline movement exercises affect their ability to change art, writing and experiential activities?

b) What would happen if teachers could use the same midline movement activities?

CHAPTER 5: AMERICAN AND RUSSIAN TEACHERS' MIDLINE MOVEMENT CLASSES, 2001

Brain Gym is the registered trademark for the Educational Kinesiology Foundation. Kinesiology is the study of movement and Educational Kinesiology as developed by Dr. Paul Dennison is the facilitation of specific movement experiences to enhance learning. As defined by Dr. Dennison it is a process for re-educating the mind/body system for accomplishing any skill or function with greater ease and efficiency (Dennison, 1994). It is described as a readiness program for learning.

I chose to study the midline because I have been teaching adults and children the Brain Gym process since 1988. As a former teacher I was interested in the use of new methods to help children and became certified to teach Brain Gym to teachers in 1989. Since that time Educational Kinesiology has become an international organization in which Brain Gym and the related courses are being taught in 80 countries having been translated into 36 languages.

The basic Brain Gym course taught teachers three midlines of Kinesiology (Tyldesley, 1989) in relation to learning. The three midlines are the frontal, saggital and the transverse. In Educational Kinesiology the saggital midline is related to the laterality dimension, which divides the left and right side of the body. The frontal midline relates to the focus dimension, which separates the front and back of the body. The transverse midline is related to the centering dimension, which divides the upper and lower part of the body as shown in Figure 12. In this course teachers learn 26 specific exercises and 2

repatternings for movement, which are related to these midlines. These concepts and exercises were conceived and developed over a span of 25 years by Dr. Paul Dennison and Gail Dennison.

The Dennisons describe brain functioning in terms of three dimensions: laterality, focus, and centering. These dimensions are translated to the Brain Gym exercises. The midline movements are related to laterality, the lengthening activities are related to focus and the energy exercises are related to centering.

> "Within laterality, or sidedness, exists the potential for bilateral integration, the ability to cross the central midline of the body and to work in the midfield. When this skill is mastered, one can process a linear, symbolic, written code, left to right or right to left, an ability fundamental to academic success. The inability to cross the midline results in such identifications as "learning disabled" or "dyslexic."
>
> Focus is the ability to cross the participation midline, which separates the back and front of the body as well as the back (occipital) and frontal lobes. Incompletion of developmental reflexes results in the inability to express oneself with ease and to participate actively in the learning process. Students who are under focused are often labeled as "inattentive," "unable to comprehend," "language-delayed," or "hyperactive." Some children are over focused and try too hard.
>
> Centering is the ability to cross the midline between the upper and lower body and the corresponding upper and lower brain functions: the midbrain (emotional content) and cerebrum (abstract thought). Nothing can be truly learned without feeling and a sense of meaningfulness. The inability to stay centered results in irrational fear, fight-or-flight responses, or an inability to feel or express emotions." (Dennison, 1994, pp. 1 & 2)

The information in Figure 12 is from Paul Dennison and Sharon Promoslow, both of whom created the graphic.

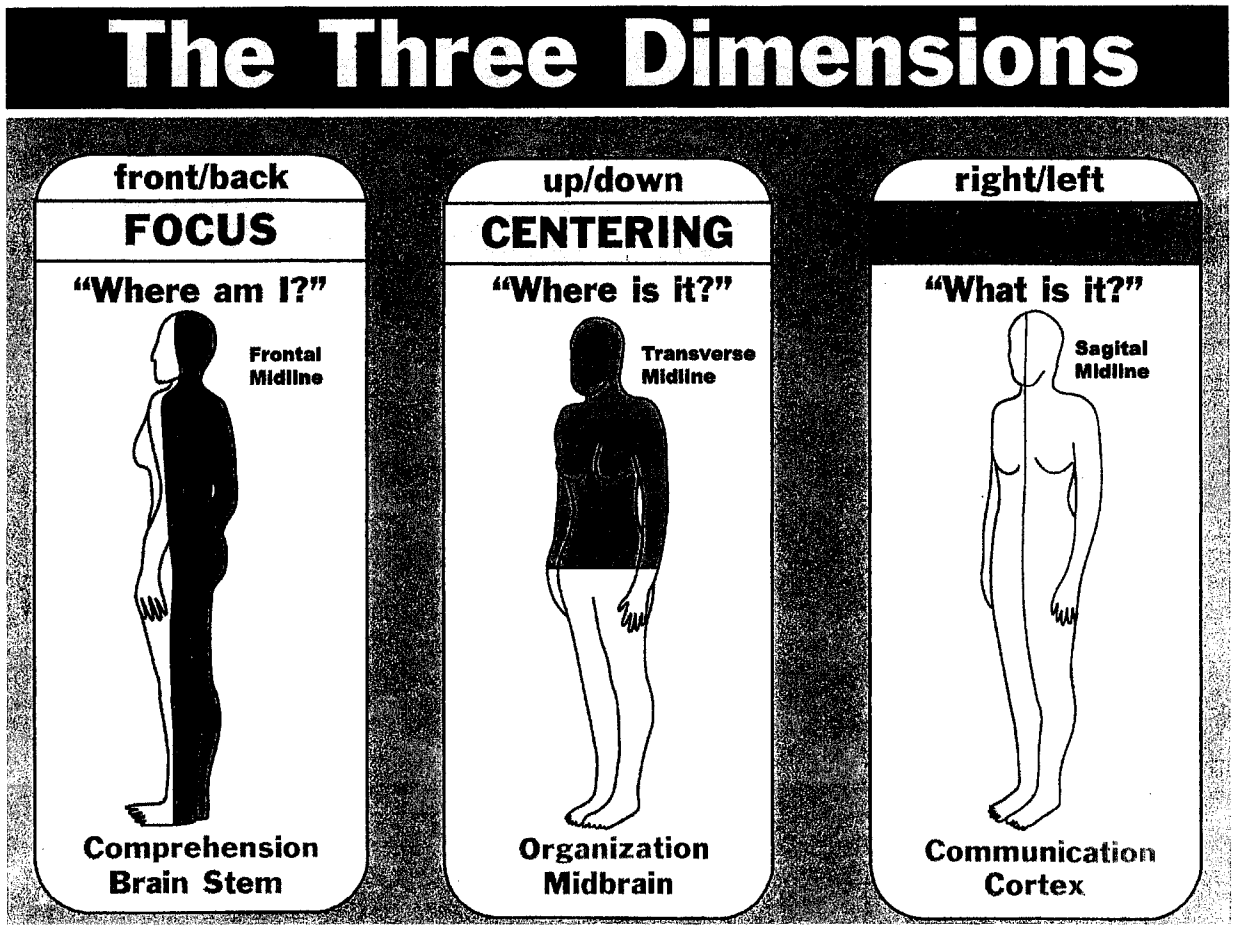


Figure 12

Teachers who take the class learn about the midline and its relationship to the three dimensions. The following data were analyzed from information provided by the teachers about their experiences while taking the classes. As part of my research I wanted to learn about the teacher's experiences while implementing the Brain Gym movements for themselves.

Background of Midline Movement Classes

Through this section, I describe the teachers from Russia and America, the physical environment in which the classes were held, and how the teachers "experienced the world," (Stake, 1994) by interactively learning the midline movements and applying the reactions they experienced to their own lives.

American teachers who took the midline movement classes in 2001 received two graduate credits through Colorado State University Continuing Education Department. Russian teachers received their advanced training credits through the Tver, Russia Regional Training Institute.

In both groups of teachers their reasons for taking the midline movement class were similar. Many of them had heard, through other teachers, of the Brain Gym process and wanted to learn the methods for the benefit of their students. Others thought the class was held at a convenient time and they needed the credits or the certificate for advancement.

Russian Midline Movement Classes

My classes were held in Tver, Russia at the Children's Palace, a place where the "Young Pioneers" met and took classes in the arts and life skills. Tver is a city of 500,000

people between St. Petersburg and Moscow. My classroom there was a large auditorium with a large stage in the front of the room, facing rows of attached chairs, which made it difficult to have interactive movement-based activities. This was a place where teachers were used to attending lectures not doing participatory exercises. I utilized the school painters, and the stage quickly became decorated with large paintings of children doing the exercises. Other large posters or what the Russians called "placards" were English-Russian translations of the processes taught in the class. At break times, teachers crowded around them, copying the instructions.

The use of posters as a teaching aid in the United States is common. However, in 1991 I inadvertently found out they carried a negative connotation in Russia. I was riding through the streets of Moscow with Dr. Bim Bad, the president of Russia's Open University when I told him about the posters I used in class. He grew quite angry and said, "All placards should be abolished. We have lived with enough placards telling us what to do with our lives." I found out his comments referred to the communist' regime's control of the people and exhorting them to follow the dictates of the state.

Fast forward ten years and you are at the Tver Regional Center for Advanced Learning, a two story building near the heart of the city. Since this is spring break more teachers can attend classes. Reaching the building by bus or route taxis, one is greeted by a woman who mans the entrance similar to the women of authority in Russian hotels who are in charge of room keys. She will ask you your purpose and direct you to the proper area. Coats, boots and other outer coverings are stored in the cloakroom near the front door.

Again, the classes were held on a large stage and my translator of many years, Dr. Maya Lotoeva was there to be my Russian voice. She is a medical doctor and was able to easily translate the medical terminology. Since she had been my primary translator since 1993 she was familiar with the material and felt at ease with the students and the class materials. In spite of her expertise, teaching an interpreted class takes at least 1/3 more time to allow for the translation.

Teachers in Russia are more formal in their dress than their American counterparts and typically dressed in skirts or dresses to attend the class. Although there was a cafeteria on the site, many brought their lunches. There were no restaurants nearby so there was no option to go out at noon. And besides it may be expensive for Russian teachers who earn an average of $70 per month.

As a volunteer, I did not charge the teachers for the class; they paid the Institute for the copied materials and translated books. I taught the same material as I did in the States. In America, I found teachers wanting more experience rather than theory, but in Russia they requested more theoretical background. This may have been because there were many more trained psychologists taking the class. In Russia, there were typically 50-75 participants, ages 21 to 50 who would attend the four-day workshop. The majority were teachers. Others who attended were health professionals, social workers, psychologists, university professors and students.

American Midline Movement Classes

In America, the classes would range from 3 to 4 days depending on the amount of material being taught and whether the participants were taking it for graduate credit. In

the twelve years I have been teaching it for Colorado State University, classes have been held at the university in Denver, various hotels and conference centers, and at schools. This is also typical in other areas of the country where other instructors conduct classes. Since classes are held on the weekends or after school, teachers are not required to dress professionally. Casual clothing is the norm and even suggested due to the kinesthetic nature of the workshop.

In contrast to the ordered rows of auditorium seating in Tver, in America the chairs are arranged in a semi circle with space in the room for practice circles. A large class is 30; typical groups are 10 to 20 teachers including some occupational therapists and counselors. As in Russia, teachers will bring their lunches or unlike Russia, go out to lunch. But both Russian and American teachers will sometimes ask for a shorter lunchtime so they can leave earlier.

Russian and American Teacher Assessments from the Midline Movement Class

In my midline movement classes, as part of the ongoing process of assessment, I asked teachers to answer the question, "How do I feel when doing the midline movements for myself?" To understand the responses from each group, I have coded the translated answers from 15 Russian teachers and 21 American teachers who took the class in the same two-year period. These teachers were selected because they took time to answer the questions. Once these answers were coded, I broke them down into categories, which I described as body awareness, emotional feelings experienced, actions taken, and academic skills enhanced.

Russian Teachers' Assessment

Each of the Russian teachers ascribed to a positive emotional state after doing the exercises. They described feelings of calmness, confidence, and joyfulness in the process of learning. Respondents used terms including: "enjoying a better mood," "feeling comfortable in my body with an easiness and lightness," and "having a feeling of inner harmony; a unity with nature."

Several commented that being able to control their emotions put them in a better mood so they could concentrate easier. One teacher remarked that doing the exercises made her feel so much better she could "make more friends."

Another area many commented on was "Body awareness". Five of the fifteen thought they had more energy. Others individually commented that they could feel their bodies better and understand the signals from their bodies, that their heads were clear, that they could understand the needs of their bodies and that their inner energy was raised.

Regarding the midline, many teachers commented that they felt more balanced on both sides of their body. This helped improve their coordination and they were aware of the changes in the muscles. They could feel the integration of the body and brain, had less tension and tiredness, and more self-control. In addition, they thought that their hearing and vision improved.

I noticed the ability to make their writing more beautiful was a skill prized by many of the Russian teachers. Five teachers cited it as a skill that improved while doing the exercises for themselves. They found it easier to read and to prepare their lessons because they felt there was less tension in their eyes. The ability to perceive and reproduce information was easier. Even finding rhymes faster was cited as a benefit.

Many teachers commented they had a desire to do new things and could achieve their goals more quickly and improve their capacity toward work. Also, these teachers reported that they could concentrate their attention and their feelings, create visual pictures, and as one teacher described, "feel themselves as magicians." They expressed "increased clairvoyance," along with having an "intuitive feeling" toward people. "Extending their youth" was another comment made, as was "being calm while making a decision." Communication, they thought, became more harmonious and they experienced good and warm attitudes with children.

This type of interactive workshop was a new experience for the Russian participants. Practicing the process in small groups, demonstrating the movement activities before the class, interacting in groups, and then presenting to the whole group drew the teachers into the process so they were able to explore it within themselves in a safe, encouraging way.

Each new process was explored and reflected upon by the teachers within groups and individually in their notebooks. These notebooks were collected at the end of the class and translated. The comments were used verbatim in this section of the dissertation.

For some, understanding the change within them was not comfortable so they asked for more theory to put the class on an intellectual rather than an experiential level. Some were uncomfortable in introducing the process to the students and said they must do it in a step-by-step process. Others wondered how they would get the parents to buy-in and stressed that it was important that the parents learn the exercises so they could practice with their children.

During the classes, I noticed that Russian teachers were able to feel changes in their bodies quickly. When practicing using muscle groups to check the dimensions of focus, laterality, and centering, they could easily feel it and demonstrate it to their colleagues without any self-consciousness. With this observation came a deep feeling of change as they completed the processes. The descriptions they gave of the changes they were experiencing were intense, vivid and relevant to the particular areas they were exploring such as vision, hearing, writing skills or movement-oriented activities.

In the twelve years since my first classes in Moscow and Tver, I have noticed this characteristic in Russian teachers and thought often about it. A common saying is "a Russian can tell what you are thinking before you say it." I have had many experiences where that has been true with people I've met in Russia.

Early in my career, Dr. Maya Lotoeva was my translator. We were on the stage at the Children's Palace ready to begin when she complained her body felt out of balance and was uncomfortable beginning the translation process. A woman in the first row overheard our conversation and without hesitation spoke up. "Maya," she said in English, which was a surprise in itself because not many of her generation spoke English, "I can see why; your 'aura' is tipped to one side." I quickly recognized the problem Maya was experiencing and suggested a re-patterning which is one of the processes taught in class to assist in balancing movement. In a few minutes the process was over and Maya said, "Oh that's much better; I feel balanced now." The lady in the front row confirmed and said, " Yes, it is true your aura is on straight now." The class started on an experiential note; the other participants in the audience did not voice that the exchange was unusual.

Russia is a culture of the east and the west. People are comfortable with the body-centered therapies, because it is part of the eastern culture and for many years western–style medicine was not available. It seems they have an intuitive sense of their bodies and of others, too.

American Teachers' Assessment

The American teachers, whom I have already described as having a more casual attitude toward the class, perhaps because it was held on the weekend, answered the questions about their feelings when doing the midline movements with the following comments.

The most common response was that the exercises made them feel centered and the second most common comment was that they felt calm. Three teachers cited their renewed confidence for communicating ideas. The positive attitude they experienced was cited and explained by one teacher who said she felt she could "swim through the day." Other teachers responded: " It gives me peace of mind; I am more able to be patient. I feel energized; and I enjoy the day with comfortable feelings." Three mentioned being "relaxed about teaching" and one wanted to use it in stress situations in the classrooms. Another comment was: "I have the ability to stay focused while still enjoying what I am doing." But all did not write laudatory statements. Uncertainty about the process and how it worked was a concern to one teacher.

Looking at body awareness, a comment was made that "the exercises made you pay attention to the body." There was a strong impression and comment on the midline, "It felt wide and bright." The cross crawl exercise was described as being helpful. One teacher remarked, "It puts me in touch with the core of my body." Three others talked

about how it made them feel connected and balanced; it gave them energy and helped breathing.

American teachers were briefer in their answers about academic improvement. They also cited the increase they noticed in their handwriting skills and their ability to listen; they were able to focus better. Improvement was seen in their fine motor skills such as improved piano playing and vocal production.

With respect to actions taken, one teacher said she was not comfortable with doing the exercises and therefore would have trouble communicating them to her high school language class. Another talked about using them whenever she began a new activity. Comments offered by others included: "putting children at ease," "creating a less stressful classroom environment," and "being able to focus better."

American teachers were accustomed to an interactive process and when we broke into groups they were comfortable about finding a place in the room that suited them. Bringing their snacks to the group they combined school talk about their classrooms with the process they were exploring.

Checking the use of the muscles in the three dimensions required several sessions of practice within the balances they were doing. It was not easy for the majority to immediately feel it in their bodies. And when they did, many wondered how they would introduce this concept into their classrooms.

In spite of their reticence with noticing the differences in the muscles for each dimension, they were able to easily talk about their own personal feelings in regard to the changes that they felt in their bodies.

One of the concerns discussed among the teachers was the ability to find time to use this in the classroom. It seemed every minute was taken with a prescribed activity and to add another was going to be difficult.

Summary of the Russian and American Midline Movement Classes

I discovered that the main comments expressed were fairly consistent across both groups. The emotional experiences of being calm and centered, of having positive feelings, of being comfortable and enjoying the process, of feeling in a better mood, and able to focus more were prevalent in both groups. Russian teachers, perhaps because the introspective process was new to them, were more vociferous in expressing their emotional experiences. In looking at body awareness, both groups of teachers expressed a strong sense of the midline and of being in touch with the core of the body. Russian teachers discussed how the exercises gave them more energy and clarity in their thoughts. They also understood body signals, became more active, and were aware of the changes in the muscles. They could feel the integration of the body and brain as the brain became more active.

In the areas of academic skills both groups cited the change they noticed in their handwriting and ability to listen. They had common beliefs about being able to focus easier. American teachers looked at the difference in fine motor skills while the Russians cited increases in memory and the ability to read and prepare lessons better.

In the area of actions to be taken, American teachers applied it to school situations and examined how to create less stressful classrooms, put children at ease, and use it to begin new activities. The Russian teachers concurred by saying they felt good about the children but that they were more interested in the actions for themselves. They felt they

could learn new things, concentrate on feelings, achieve goals more quickly and have an increased capacity for work.

The information I collected from the experiences of the teachers who took the Brain Gym midline movement classes and their observations using the material in their classrooms was used to generate my focus on how these exercises may influence student posture, focus and behavior in the classroom. Teachers who had knowledge of the midline movements and its application, for themselves and their students, in the classroom, were better able to assess the benefits. Some of the teachers who took these classes were instrumental in the development of the student evaluation form used in the American study.

CHAPTER 6: RUSSIAN PILOT STUDY - TVER REGIONAL INSTITUTE FOR ADVANCED LEARNING, 2001-2002

Originally I had wanted to include the Russian study as part of the main study of the dissertation because the original structure was a cross-cultural analysis between American and Russian teachers. However, due to cultural restrictions regarding consent forms, I was unable to include the Russian study as part of the main study and had to use it as a pilot study. The Russian pilot study information is important because it gave me the basis of what I wanted to look at in the American study. Russian teachers are different culturally and I wanted to explore how they implemented the midline movement exercises and established routines. I was curious about the differences in student learning, material translation and use of forms. The root of midline movement research originally came out of Russia from I. M. Sechenov. Teachers in Russia are aware of reflex work by Sechenov and the vital importance of reflex integration in developmental learning.

The pilot study took place in Tver, Russia, a city that became the official sister region to Jefferson County, Colorado in 1997. It is located approximately 160 km or 96 miles from Moscow and 540 km or 325 miles from St. Petersburg on the upper mouth of the Volga River. In 1238, the Tatars conquered and burned Tver but were routed by the Russian army. In 1298, another invasion by the Tatars into Russian territory destroyed 14 towns but the people of Tver resisted the invasion and drove them out.

The research site in Russia was chosen because of the support I have had since 1991 for arranging classes, interpreters and meeting with teachers. For the past seven years, the Tver Regional Institute for Advanced Learning, with support from the Regional

Education Administration, have been my sponsors. They have arranged and supported my work in the schools in the Tver region.

History

In the 14th and 15th century, Tver became a large economic and cultural center of Russia and was slated to be the capitol of Russia but political supremacy by the Princes of Moscow caused Tver to lose and Moscow to be chosen.

During the era of Communism, Tver was renamed Kalinin after a chairman of the Supreme Soviet of the USSR from 1922 to 1938. After Peristroika and by the decree of Yeltsin, the president of Russia, and Belousov, the presiding Governor of the region, Kalinin reverted back to the original name of Tver.

As to its meaning, the actual name Tver has several versions of its meaning. Some scientists connect it with the Finnish word "tiort" that means "quick" or "fast". Others believe it came from the Russian word "tverd"(firm) or Polish "twordza" (fortress).

I became acquainted with the people of Tver in 1991 when my husband and I spent a year in Russia as Rotary volunteers. For that year, under the auspices of the University of the Academy of Education in Moscow and Tver Regional Training Center for Teachers, I worked with students and teachers in Moscow and in Tver. As volunteers we lived like other Russians, often finding ourselves in food lines.

These were the early days of freedom and people voiced their opinions and took strong actions. Statues of former communist leaders were dragged down and away from the school buildings and town squares. Many of those still standing were defiled with paint. In school buildings where we held classes in the evenings, mural posters lined the

walls. The posters showed students engaged in military training, learning how to take apart a Kalishnikov rifle and how to protect themselves from biological warfare. Concerned parents with whom I spoke said they resisted this type of required training for their children. After the "Putch" (the unsuccessful ouster of Gorbechov), these parents refused to enroll their children for military training classes. At that time, pictures of Lenin were still prominent on the walls. In the years following 1991, when I returned several times for month-long training sessions with teachers, the political propaganda was removed; instead teachers were more concerned with striking for higher wages, something they couldn't do under the old regime.

Pilot Study Description

The Russian pilot study was conducted in the fall of 2001 and the spring of 2002 – 10 years after I first began teaching in Russia. The study's goal was to observe students doing midline movement activities. The pilot study focus was influenced by information gained from the midline movement class I taught to teachers in Tver and from hand movements taught by Alla Syrotyuk. She had attended my classes in March of 2001 and assisted the teachers in presenting the movements to their classes.

The pilot study was sponsored by the Tver Regional Training Center for Teachers under the direction of the Center's Co-Director and psychologist, Lyubov Anatoljevna Macknovets and Alla Leonidova Syrutyuk, Assistant Professor of Psychology at Tver State University, school psychologist and teacher training instructor at the Center. The Center is responsible for the development of teaching methods for teachers in the Tver region. Retired Tver State University English professor, Galena Ivanova Tyulina and her

granddaughter, Kartya Tyulina (A third year English student at Tver State University.) managed and translated the pilot study.

The following Tver primary teachers were involved in the pilot study: V.A. Sotnikova, N.V. Makarova, L.P. Poyarkova, N.N. Tsvetkova, I.V.Morosova, music teacher - O.V. Kaleman and school psychologist - L.E. Krasavtseva. The teachers participated in the pilot study for four weeks, doing the exercises in the classroom with the students for 10 to 15 minutes per day. The students were encouraged to drink water, do midline movements, lengthening activities, energy and posture exercises and viewed individual cards with an X on them. The students chosen did not have the ability to do contralateral movements that crossed the midline of the body. They could do only one sided (homolateral movements) as a result of developmental problems.

To create a visual picture of Russian schools in the city of Tver, imagine concrete, rectangular buildings. The school buildings are the same as the apartments inhabited by the majority of citizens living in Russian cities. Typically, they are three to five stories tall with a play yard in the back of several buildings. Schools and apartment structures are interspersed with commercial shops throughout the city. If people cannot walk to school, trolley, buses or route taxis are the main mode of transportation. Inside the buildings, wide staircases lead to the white painted classrooms, which typically have 30 to 40 students.

The classrooms are plain with single desks and connected seats lined up in rows facing the front of the room. Blackboards are the main source of communication. Teachers face the class and, following tradition, expect students to keep their hands folded in front of them, lifting up one hand from the elbow to signal a desire to talk.

Many students wear uniforms, which consist of white shirts, blue or brown trousers and/or skirts. Students can bring lunches or eat in the cafeteria where they are served hearty, lunches by women in white caps and aprons that allow no tomfoolery in the lunch line. Generally the students are allowed to talk and enjoy being with their friends while eating lunch but there is no lingering and they are expected to spend time outside, even in the cold winter months.

The schools where the research was conducted were similar in nature to each other and were located in the main part of the city. Collectively these primary and secondary schools each had a population of approximately 1,000 students. Nine teachers from seven different schools participated in the pilot study. The schools participating were School #30 with three teachers, and schools # 7, 18, 20, 42, 52 and #128 each with one teacher. The pilot study included 37 students ranging in age from 6 to 11. In the fall pilot study, seven teachers participated for a period of four weeks, doing the exercises in the classroom for a period of 10 to 15 minutes per day.

Results of Russian Pilot Study, Fall 2001

Overall, the teachers noticed that the students became more active, attentive and enthusiastic in what was being taught. Their handwriting improved, they began to read faster, could memorize poems, and their whole process of thinking became faster and better expressed logically.

The music teacher, Kaleman, noticed children's voices became stronger and they had a better ear for their music. After listening to music, their creative thinking, expression of emotions and verbalization of feelings were more pronounced.

Two first-grade teachers who taught at the same school noticed that by the third week, three of their students were becoming more impulsive in their answers. They attributed this to an intensification of their hyperactive problems. They felt the students were "staying in crisis." After the third week, the teachers noticed the students handwriting and reading improved and they were able to settle down and become more attentive. The teachers sent some handwriting examples from one boy in their class, which showed much steadier and less shaky writing. After one month, the figures in his math problems are more coordinated and are placed on the page in a consecutive manner rather than put randomly all over the page. See Figures 13 and 14 below for examples of the changes in the student's handwriting.

Russian Writing Sample – At Start of Program

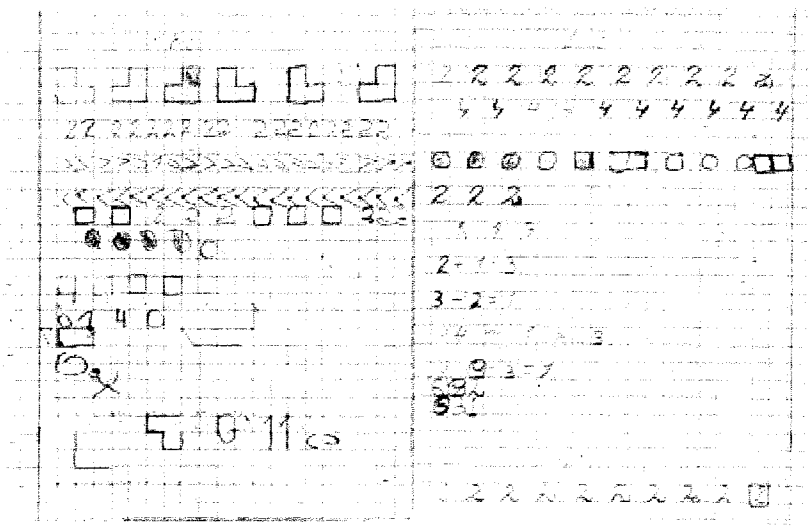


Figure 13

Russian Writing Sample – After One Month

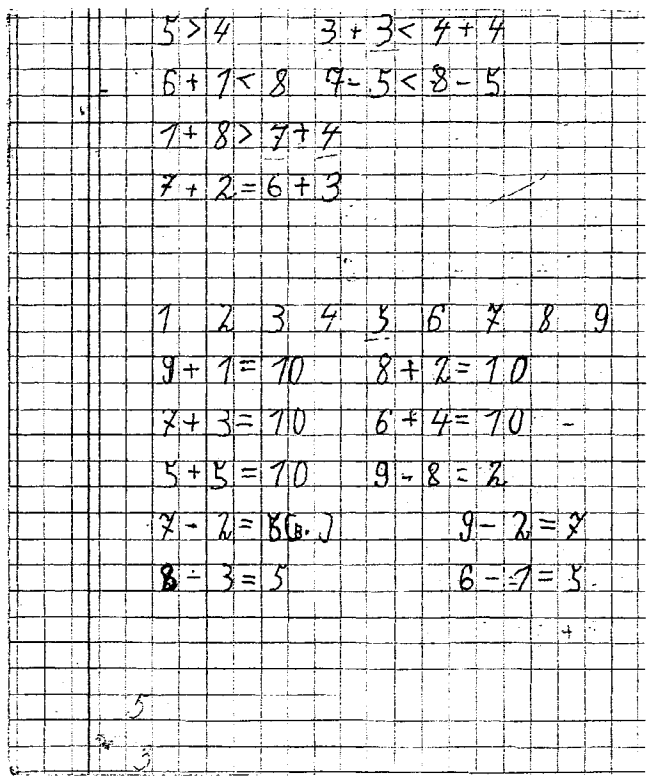


Figure 14

After doing the exercises for two to three weeks, increased hyperactivity was reported by a fourth grade teacher in one school and a third grade teacher in another school. By the end of the pilot study the teachers reported that the students' attention span improved and they were able to keep on task with their work.

Some of the positive results observed by a third grade teacher included students learning poems and the multiplication tables faster and easier. But one of the students she observed showed no change in any area.

One of the teachers remarked after the study, "When I see what positive changes take place with the children after doing those exercises, it makes me feel creepy all over."

Results of Russian Pilot Study, Spring 2002

In the spring pilot study, six teachers participated; four of who also participated in the Fall 2001 study. New teachers added were Z. Nikanorova, and N.Svezhova. As in the fall pilot study they did the exercises 10 to 15 minutes each day for a period of four to six weeks. Many of the students the teachers chose to observe had both mental and physical disabilities. The students were 6 to 12 years old.

In the process of the pilot study, they noticed a change in the students posture, their ability to focus, and their behavior before and after the exercises. Some of the key phases they used in describing the children before the exercises and their inability to cross the midline involved terms such as:

- restless,
- unbalanced,
- can't sit still, and
- crossed the midline with difficulty.

Inability to cross the midline was cited in ten cases whereas crossing the midline with difficulty involved eight cases. Sitting straight was a behavior desired by many teachers as an indicator of attention. They often used terms such as swinging, sitting at a half turn, leaning on the desk, and not sitting still to describe the children. As indicators of the inhibition of reflexes, they noticed postural problems such as being round shouldered, shallow breathing, elbows hanging and constantly wanting to change posture.

Reflex inhibition is a term long used by physiologists to indicate the process of a reflex weakening and being subordinated to a higher reflex. Masgutova (2003) discusses this process by citing the work of Russian scientist L.S. Vygotsky, who believed the first

infant reflexes did not disappear but continued to work with the higher reflexes, each one building upon the other. Because of the work of scientists such as Sechenov, Pavlov and Vygotsky, Russian teachers are trained to look for these anomalies in their students.

However enthusiasm in the classroom waned for some Russian students by the end of the week as teachers noticed they were getting tired. Teachers were concerned about the students' inability to focus on academic subjects. They discussed this inability in these terms: "The student has a vacant, blank stare. Student is inattentive, can't sit still. He is distracted, uneasy, wants to leave the classroom. She is not quite sure in crossing midline. It's difficult to get the student involved in work. The student is aloof, non-productive."

One teacher noted that the most improved girl in the pilot study was more involved in her schoolwork, more independent, concentrated better and developed a better ability to perceive instructions. She still was not completely sure in her ability to cross the midline but had made progress since the beginning of the pilot study. Another student in the group became active and sure of his abilities. The teacher noticed he was eager to share his knowledge when working at the blackboard. Two of her students in the risk group showed no changes. They were very delayed in their mental and physical development and their parents were not interested in being involved.

The music teacher observed that the students became more quiet and concentrated. They were able to exhibit diaphragmatic breathing, expressive singing and were more emotional in their singing.

Some of the comments shared by the other teachers showed that it took about three weeks for those who were unable to focus to pull themselves together, to become more positive in their behaviors. One teacher said that the exercises proved the student

could concentrate better and be more confident. In the group of students who were 11 and 12 years of age, it was more difficult for the teacher to see progress. This corresponds with Syrotyuk's (2003) observation that children who are younger show more improvement than children over twelve years of age because they haven't fully developed their compensative behaviors. Furthermore, she believes those children who have learning disabilities show more improvement than those who have a higher level of functioning. Syrotyuk (2003) believes that children who display learning disabilities make a more pronounced jump in mental function because the integrative capacity of the brain has been increased.

The school psychologist, who saw the pupils in her group once a week noted that by the fourth to fifth week the pupils in her group were able to concentrate and rather than a "vacant" look had a "sensible" look, a "quiet posture" and were able to cross the midline.

Comments from Russian Teachers

Many of the Russian teachers in the pilot study reported that some of their students at the beginning of the week were: un-concentrated, restless, over excited and absent minded. By the middle of week these teachers observed that the students were: more quiet, concentrated better, independent in activities, surer of their work, and crossed the midline precisely with more confidence. By Friday students were tired and less attentive.

Three of the Russian teachers reported more confidence in their teaching skills because as they were more aware of their own bodies they became more aware what was

going on in their students' bodies. They reported a higher level of concentration and energy throughout the day. The teacher observations below relate directly to posture, focus and behavior.

One of the Russian teachers reported that poor physical development issues attributed to problems doing the exercises. Some of the older Russian boys experienced peer pressure about doing the exercises and therefore responded poorly to the study. Other teachers also felt similar time constraints about fitting the exercises into a busy daily schedule. They also reported barriers in parent education about the exercises and the study. Many parents did not want their children identified as having a problem.

Posture, Focus and Behavior

Several of the Russian teachers noticed the children were constrained, weak and rigid at the beginning of the study. By the third week of the pilot study over 75% had changes in their posture; examples included being more relaxed, strong in their movements and more fluid while doing the exercises. The students were not falling out of their chairs but were able to sit up straight and pay attention.

Comments from several of the Russian teachers indicated that many of the students were able to do their exercises independently. For a majority of the students in the study, handwriting and reading skills improved.

Two Russian teachers in different classrooms noticed that, early in the pilot study, some of the students became more talkative, made loud noises and some even began fighting. By the third week this behavior disappeared and some of the students became more calm and focused. Several of the teachers reported the exercises lessened emotional

outbursts and helped the students react to emotional problems at home in a more effective manner.

On Mondays and Fridays, which were hard days behaviorally, all of the teachers noticed doing the exercises made the days easier, as there were fewer emotional outbursts. The teachers noticed their students had emotional enthusiasm and could perform the work easily without getting tired. However, enthusiasm in the classroom waned for the students by the end of the week as teachers noticed they were getting tired.

Comparisons Between Russian and American Classrooms

It's interesting to note the cultural differences in the Russian and American classrooms. When I was teaching in Tver, I visited one of the classrooms at school #30 where the pilot study was taking place. I was enthralled to see how the teacher skillfully guided the students through an appreciation of beautiful poems by the Russian Nobel Prize winning poet, Boris Pasternak, using the movement exercises as part of the lesson. She began by asking the children what they needed to keep their brains working. Realizing they were part of a classroom drama and that we were the audience the children replied as one chorus - "Water." They blurted it enthusiastically and a variety of bottles were pulled from their rucksacks (backpacks). She then had them demonstrate the brain button points below their collarbone that she told them brought blood flow to the brain. She questioned them, "How do we make the motor connection from one side of the brain to the other side of the body?" The students rose from their seats and enthusiastically began to match a hand to the knee on opposite sides of the body. Many other cross-crawl contralateral variations ensued: backwards, to the side, and legs straight out. This freedom from the

confinement of the desks was a welcome respite. Other midline movements developed by Dennison, as well as hand and finger exercises developed by Syrotyuk, were interwoven during the class period. As part of lesson, the children wrote their own poems and read them to the class.

During our discussion after the class about Russian and American teaching methods, I asked the teacher about the lack of anything on the walls. She replied that she felt it drew attention away from the lesson and made the children feel scattered if they had too much visual impact on their eyes. I noticed other classrooms I visited were similar. This was a contrast to the cornucopia of sight, sound and smell in American classrooms.

For a period of three months, prior to working in the Fall 2001 pilot study, Syrotyuk conducted several studies involving elementary students in the Tver region (Syrotyuk, 2002). One of these studies involved working with 180 children to understand different brain organization patterns. In this study, they found of the 180 Russian schoolchildren tested, 22.2% of the children had left hemisphere dominance, 32.8% were right hemisphere dominant and 45% had both hemispheres equally dominant. Using a variety of tests they found children with equally dominant hemispheres (72.8%) achieved the highest scores. Those with right hemisphere dominance had the lowest scores (54.2%). This, she explained, was due to the over-emphasis placed by teachers on the use of the logic or left hemisphere in classroom academics. In addition, after a period of three months using Brain Gym with hand and finger exercises, positive changes were noted in the children, especially those in the six to nine year age group. They also noted that because of the different asymmetries of the brain, they needed to work out different strategies of teaching to individual students.

Studies conducted with American children have also verified the problems associated with right hemisphere dominance (Hannaford, 1997, p. 144). In a different study conducted with 218 students, a random sample was selected including the following categories: Gifted and Talented, Normal, Remedial, Special Education, Emotionally Handicapped, and those in a high school redirection program. Hannaford found that the Gifted and Talented and Normal children were predominately logic hemisphere dominant whereas the Special Education children were gestalt dominant. Students with a logic hemisphere dominance demonstrated high linear and verbal abilities whereas those with gestalt dominance had lower linear and verbal skills. Hannaford believed this was due to schoolwork being geared toward the competencies of logic dominant students.

Masgutova (1999) cited the results of research concerning reflexes on groups of 832 school children ages 4-12 years old. In this study, problems with the integration of the reflexes, specifically the Asymmetrical Tonic Neck Reflex (78%), the Symmetrical Tonic Neck Reflex (49%), and the Spinal Reflexes (38%), were noted in problems with memory, hyperactivity and attention disorder. Could these results be seen in a larger population, one that represented diverse groups? As a researcher, I look forward to working with Russian teachers to implement a larger-scale study to explore these questions further.

Future Research

I believe that these pilot studies are particularly important for the implementation of future research in three areas. One of my concerns involved the children whose hyperactivity increased after doing the exercises for two to three weeks. Eventually they

began to settle down and do their schoolwork without any problems. What was happening in their bodies while doing midline-crossing exercises? What about the students who had no change? Why did their bodies resist change? An outcome of the questions raised by the Russian teachers in the pilot study was the development of the visual analog form. This form explored these questions using the input of American teachers.

CHAPTER 7: AMERICAN CASE STUDY ON STUDENTS USING MIDLINE MOVEMENTS, 2002

Midline Movement in American Schools

As I analyzed the data from this case study, I stepped back in time and remembered the words of Ivan Michealovich Sechenov. He was widely known as the father of Russian physiology and his research inspired me to begin this work.

"The infinite diversity of the external manifestation of cerebral activity can be reduced to ultimately a single phenomenon, muscular movement.

> Child laughing at the sight of a toy,
> Garibaldi smiling when persecuted for excessive love of his native land,
> Girl trembling at the first thought of love,
> Newton creating the laws of nature and reflecting them on paper,
> The ultimate fact is muscular movement," (Yaroshevsky, 1986, p. 2).

In this study, muscular movement is defined as the movement of the muscles across the midline of the body. The purpose, to discover the effects of contralateral movement across the midline, was explored by 16 teachers and 63 students in different socioeconomic school situations. Who were the teachers and the students?

Teachers and Schools

The teachers were selected because they had previous training using the midline movements known as Brain Gym. Some of the teachers had used several of the movements in the classroom, but all were aware of how to teach them. Since I wanted different parts of the country represented and different types of schools, I asked teachers

who met the criteria to participate in the study. I also asked Brain Gym consultants who had a deeper knowledge of Brain Gym to be the mentors for each group of teachers and assist them if they had questions. Three mentors assisted the teachers from New Mexico, Georgia and Minnesota while I worked with the teachers from Colorado. I used 16 teachers in 11 different public or private schools. The school populations represented all socio-economic levels and many ethnic variations. There were 10 teachers from Colorado: two from the Jefferson County school district; one from the Denver County school district; one from a Catholic school in the Archdiocese of Denver; five from the St. Vrain school district; and one from the Colorado Springs school district. In addition, three teachers taught in Minnesota, two in New Mexico and one in Georgia. Below is a table, which summarizes the school location, size, type and socio-economic level.

Schools in American Study

School Location	Size	Type	Socio Economic
Colorado	207	Urban	Low
Colorado	250	Suburban Rural	High
Colorado	260	Suburban Rural	High
Colorado	270	Urban	Low
Colorado	490	Urban	Low
Colorado	500	Suburban Rural	Medium
Georgia	800	Suburban	High
Minnesota	300	Urban	Medium
Minnesota	400	Suburban	Low
Minnesota	550	Suburban	Medium
New Mexico	270	Rural	Low

Table 1

The teachers' classrooms consisted of: two 2nd-grade classrooms, four 3rd-grade classrooms, three 4th-grade classrooms and one 5th-grade classroom and four multi-grade classrooms. Two other classrooms were for special education.

Students

The data were collected over a period of six to eight weeks. Teachers taught the exercises to the entire classroom. However, out of all the classrooms, only 63 students were chosen to participate in the study. The characteristics of these students included: 39 males, 24 females, 39 students came from Colorado schools and 24 students came from the other states cited.

Students' ages ranged from 6 to 11-years-old. The majority of the students, 46 out of 63, were from seven to nine years old. There were almost twice as many males as females (39 vs. 24) selected for the study. Hannaford (1995) discusses the mylenation of the hemispheres occurring later in boys and suggests this may be the reason for increased labeling in boys over girls. Healy (1990) discusses that one third of all American boys meet some of the criteria for hyperactivity.

Student Criteria

The teachers were asked to select three to five students based on their inability to focus on academics. Out of 63 students, six were diagnosed as having Attention Deficit or Attention Deficit Hyperactive Disorder. Of these six, two 7-year-old males and one 10-year-old female were taking drugs such as Ritalin or Aderol. The other three males, ages 7, 8 and 10, were not taking any medication. These figures are concurrent with the statistic of 5-10% of classroom children labeled ADD or ADHD in the United States (Jennings 2000). Barkley (1997) cites that ADHD exists in 3-7% of school populations with a 3 to 1 predominance in boys.

Since the inability to focus on academic studies was a criterion for selection in the study, all but two students had this learning challenge. The two that didn't were part of the study because one six-year-old boy had problems with fine motor skills because of cerebral palsy and another boy was task oriented but was chosen to be part of the study because of his poor reading skills.

Pre-Study Descriptions of Students by Grade Level

Grade One, 6-Year-Olds

The three boys and one girl in the 1st-grade were in a 1st-3rd multi-grade classroom. All were lacking in fine motor skills. One boy had cerebral palsy and was born three months premature. He was described as being bright and was in the study because of the lack of fine motor skills. Short attention spans with the inability to sit still characterized the others. They were either just learning letters or were beginning readers.

Grade Two, 7-Year-Olds

The largest group in the study was comprised of 10 boys and 8 girls who were seven years old and in the 2nd grade. The main challenge that was cited for three-fourths of the students, including boys and girls, was a low reading level. With the lack of reading skills, speech problems affected four of the students in the low reading group. Writing problems went hand-in-hand with attention problems in three of the students.

Teachers especially noticed the lack of core motor skills in three boys and one girl. They described the students as being clumsy and physically awkward. They bumped into people, leaned back on their chairs, and walked or hopped swinging their arms and legs in an exaggerated manner. One child, who was physically awkward, also hummed and

constantly made sounds. Lack of attention was characterized in four students by "spacing out, and not being able to remember directions or sequences."

Grade Three, 8-Year-Olds

Low reading skills typified half of the 17 students of which there were nine girls and eight boys. Four of the students experienced fine motor problems, which resulted in low writing skills because of reversals in spelling. Again, the inability to stay still or as one teacher described, "being in constant motion," led to distractibility and the students being off-task with little or no focus. This description equally applied to both the boys and the girls in this group. Teachers found two of the students to have lack of confidence and low self esteem issues.

Grade Four, 9-Year-Olds

Characteristics found among this group of 11 students including ten boys and one girl were: low motivation, lack of persistence, over focus, no focus and lack of listening. A student who was uncomfortable in his body was also constantly in motion and drifting off task. He needed constant prompting once he started a task. An over focused student was so worried about the outcome that he couldn't concentrate on the task at hand.

Grade Five, 10 to 11-Year-Olds

Low skills in reading, math, the inability to follow directions and keep focused were challenges cited for a majority of the 13 students in this grade. In both the 10-year-old and 11-year-old group, there were eight boys and five girls. At this age, lack of interest and low motivation went hand-in-hand with a sassy attitude for one student, anger

for another and constantly talking for two girls. One student's issue with self-esteem and a bad attitude was combined with his inability to sit still.

Summary of Student Characteristics

To summarize the student characteristics emphasized by the teachers, low reading skills were determined in 26 students of all age groups. The group was equally divided between boys and girls. Math was difficult for four boys, ages 7-10 and three girls 7 and 8 years old. Speech problems were cited in six boys, 7,8 and 9-years-old and one, 7-year-old girl. Writing skills were difficult for three students, 7, 8 and 9-year-old males and one, 7-year-old girl. This information reflects what the teachers chose to share about each of the students and is not meant to be a complete profile of the academic skills of the students. In fact, two of the teachers chose to write nothing at all about their students in the pre-study descriptions.

Diversity of the Schools

Both the teachers and the 11 schools, in which the teachers worked, were chosen to represent a variety of ethnic and socio-economic cultures. The teachers provided descriptions of their schools before the study. Mission statements for the individual schools were similar in that they emphasized respect for themselves and for other individuals. Other values included: independence, responsible work ethic, love of learning and a sense of community. Private Catholic school standards reflected the value of having God as part of the classroom activities.

School populations ranged from 200 to 800 students. Five schools had an average population of 250 students, four had a population of 500 and the largest school had 800

students. The smallest was a Catholic school in Colorado; the largest was located in Georgia.

Teachers cited special awards and programs for their individual schools. One school in Minnesota won the School of Excellence award in 2002 but this year had to bus students to another area because of asbestos problems in the building. Another multi-age classroom of third through fifth grade students competes in the Shakespeare festival in Denver every year.

The low socio-economic level was reflected in four of the schools whose students qualified for the Title 1, free lunch program. One was a city school for children with behavioral problems; two others, one private and one public, were inner city schools in a multi-cultural, low-income neighborhood. The other six schools were primarily from middle class neighborhoods and were ethnically diverse. In two of the schools the majority of students were Caucasian and their economic situations represented an upper middle to upper class level of income.

Teacher Interviews at Six Weeks

Six weeks into the study four teachers (two from Colorado, one from Minnesota and one from Georgia) were contacted as a representative sample to give their impressions of the study. All were asked the same questions related to what had happened since the study began in the classroom. These questions related to the following areas:

Observations

In the beginning of the study, the teacher of the 10 and 11-year-olds in the inner city Catholic school described her students as having low skills, motivation and interest.

The three girls were extremely talkative and would lose focus easily in class. The two boys were not doing well academically; one might fail, one already had failed and was in the fifth grade for the second time. The first boy was known as the class clown; the second had an explosive temper and was angry because his mother had left the family.

After six weeks, the teacher felt the girls were more serious about doing the exercises and liked to play music while doing them. However, the boys, especially those with behavior problems, thought the exercises were a joke and they laughed and misbehaved. The teacher noticed that for some of the boys in class, understanding where they were in space was a difficult task for them to accomplish. If they closed their eyes they would lose their balance and couldn't cross the midline. This was especially true of one of the boys in the study who was homolateral (one sided), and couldn't cross the midline at all. Another boy had emotional problems at home, which caused him to be "in another world." Since his mother had left home he could not focus on his schoolwork. The teacher reported that by Friday he was very "fidgety," thinking about the weekend at home.

The girls in her group were very talkative, some even acting "sassy" but they were comfortable in their space and found it easy to cross the midline. After six weeks, they acted more responsibly in class and were using the exercises on their own in preparation for tests.

The special education teacher from a rural mountain school worked with emotionally disturbed and learning disabled children. One 8-year-old boy was in a foster home. He was labeled hyperactive and had a learning disability. The other three children, 7 and 8-year-old boys and a 7-year-old girl all had learning disabilities with speech

problems. The teacher found that the children were more focused after six weeks of doing the Brain Gym exercises than they had been in the beginning of the program. Two of her students were comfortable in their ability to understand where they were in space and to cross the midline. However, various emotional problems caused two other students to have less of an awareness of their position in space. Crossing the midline was difficult for all the students in the beginning but after two or three weeks of practice they were able to do it and felt focused, calmer and could settle down to a task.

The second Catholic School was in Minnesota. In this fourth grade classroom, students were 9, 10 and 11-years-old. Four of the five students received Title One assistance in reading and math. The fifth student had ADD/ADHD. One student had problems with dyslexia but received help at home. The teacher used the terms "unorganized," "talkative," and "can't follow directions" when describing this group of students.

After six weeks of performing the Brain Gym exercises only one child could not cross the midline. The teacher noticed his demeanor was very "spacey." His arms were very limp and he found it difficult to do the exercises. He was on medication for Attention Deficit Hyperactive Disorder but would often spit out the medication. The teacher described his behavior, as "horrible" and he would frequently get the other children off task, disrupting the whole class. Her other students were able to cross the midline; their focus and behavior in the classroom had also improved.

The research teacher from a suburban school in Georgia had all 7-year-old students. She affirmed two students were bright and enjoyed reading and two struggled with reading and handwriting. The two who struggled in reading and handwriting were

also awkward physically, bumping into people and desks. All were described as unable to focus and inattentive to instruction. After six weeks she noticed the students were better able to "tune in" or focus. They had improved in their ability to know where they were in space because they were not bumping into each other. As a result there were fewer altercations in the classroom.

Though the students were able to cross the midline easily after six weeks, they were challenged by the visual exercise of tracking. The tracking exercise or "lazy eights" is an exercise that required them to draw the infinity sign in space across the frontal midline with each hand separately and then with the hands together. Once they mastered the tracking exercise, three out of the four students had improved handwriting. The teacher described the students handwriting at the beginning of the study as "atrocious" or "very poor". In addition, they were described as inattentive to her instruction. By the sixth week she said they were acting responsibly, had a positive attitude and were able to accomplish tasks. The emotional problems of one student who cried easily were expressed by her inability to take on new challenges. She was described in the beginning of the study as "not able to understand instruction, needs to be told two and three times what the lesson is and walks around the classroom hopping and slinging her arms". This student didn't show any improvement during the course of the study.

Students with Physical Challenges

Physical Challenges Influencing the Ability to Cross the Midline

During the study it became apparent that many of the students had physical problems, which were visually apparent to the teachers. The teachers recorded these

problems on the student evaluation forms. In order to understand the concept of the midline and its relationship to physical problems, I decided to examine this group independently and in more detail.

If a child cannot control his or her movements then it may be difficult to control emotions or actions. This inability to control movement causes developmental challenges explored by Masgutova (1999), O'Dell & Cook (1997), and Goddard (1996). In their research they have found the inability to control movement is directly related to a lack of reflex integration in the body and subsequently the postures are used for compensation.

To understand the some of the physical and behavioral changes the teachers observed in students and their ability to cross the while doing the midline movements, comments are outlined below:

- Many teachers noticed emotions in the students that ranged from being explosive and distrustful to exhibiting low self-esteem, no confidence and crying. Some students showed their emotions by: physically hitting others, spitting out their Ritalin medication, creating conflict situations in the classroom, wanting hugs, holding the teacher's hand and wanting to touch everyone.
- Hyperactive movements such as leaning back in the chair and rocking were observed in all age groups, except the 6-year-olds. Two 7 and 8-year-old students chose to jump, hop and skip instead of walking. Other actions that indicated hyperactivity were acting "spacey" and unsettled, being in constant movement and not wanting to sit down.
- Postures such as lying on the floor, slumping over the desk and being too weak in the arms to do the arm exercises were indicators of hypo-active postures. This was noted

in all the age groups studied. Other problems encountered in the beginning of the study included falling over while trying to cross the midline of the cross crawl exercises. Many of the younger children 6 to 8-years-old were identified as awkward in their movements. Being tired and lethargic was a problem for eight students ages 7 to 10-years-old.

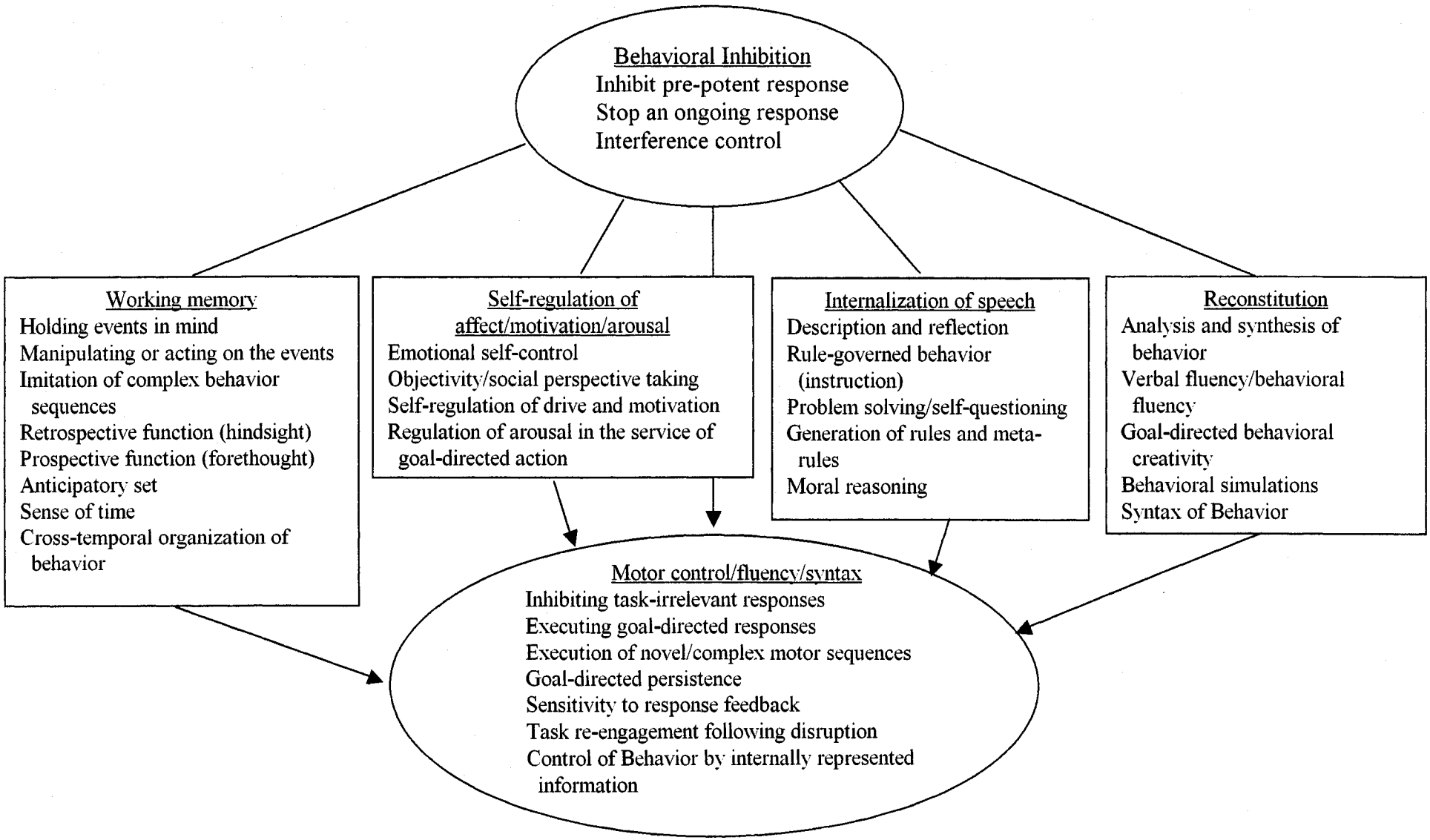
- The inability to focus was described by teachers as being "spaced out" which caused the student to hear only the first direction and ignore the next or to miss the directions entirely. While all the students were chosen because of problems with the ability to focus on academics, the particular students described as being spaced out included eight 7, 8 and 9-year-old boys and a 7 and 9-year-old girl.
- While the inability to verbalize caused seven of the students to be recommended for specialized speech training, five others in all age groups were described as having speech behaviors that disrupted the classroom. They were described as engaging in: silly talk, complaining, being sassy, blurting out and humming. Three of the 11-year-olds were described as being too talkative.
- Gross motor problems relating to the inability to sit still and awkwardness were described in all groups, except the 11-year-olds. Other characteristics noted were challenges related to fine motor skills in the six to nine year old group.
- Visual accommodation was noticed when students adjusted their paper completely to one side to write or turned the paper off vertical, to one side or the other, to read.

Motor problems such as those described by the teachers have been associated with inadequate brain development. In their study to determine a biological basis for ADHD, Giedd et al. (1994) used magnetic resonance imaging to measure the cross sections of the

corpus callosum in 18 boys with ADHD and 18 normal boys. Their findings supported the theory that hyperactive behavior was due to abnormal frontal lobe development. In addition, the inability to access both sides of the midline has been attributed to the failure to perform gross motor skills across the midline (Woodard, 1999), to early developmental problems with ipsilateral and contralateral movement (Provine & Westerman, 1979) and with the development of laterality (Kephardt, 1969).

Comments such as those noted above by teachers describe behavior, speech, fine and gross motor skill problems resulting in academic deficiencies that are congruent with Barkley's (1997) model of four neuro-psychological functions. His model, "A Hybrid Neuropsychological Model of Executive (Self-Regulatory) Functions," is illustrated in Figure 15.

A Hybrid Neuropsychological Model of Executive (Self-Regulatory) Functions



A schematic configuration of a conceptual model that links behavioral inhibition with the performance of the four executive functions that bring motor control, fluency, and syntax under the control of internally represented information.

Figure 15

The functions related to behavioral inhibition are working memory, which relates to teacher descriptions of students not being able to remember directions or not being able to systematize directions. The regulation of motivation may relate to feelings that the children are either spaced out or over-focused. Behavioral inhibitors such as the comments about hitting, blurting out or humming are part of the category known as reconstitution. The internalization of speech relates to the speech challenges of the students.

In order to perform these cognitive, neuropsychological functions, Barkley believes that behavioral inhibition is paramount. He further states these abilities are critical to self-regulation and the resultant motor control, as well as, the ability to set goals and persist in activities. One of the areas of poor behavioral inhibition is the inability to self-regulate speech. He notices that children with this problem talk more than others, either aloud or to themselves, and make more vocal noises than others. This relates to the teacher's comments about humming, blurting out or being too talkative.

Changes in Students with Physical Problems During the Study

The following information describes observations of the teachers recorded on the student matrix and the changes they noted in each student's physical behaviors.

Six-year-old students who had physical problems in crossing the midline at the beginning of the study were described as being awkward and stressed. The teacher also thought they acted "spacey," unsettled, uncoordinated and sloppy. By the end of the study all of the 6-year-olds had improved. The student who wanted to lie on the floor was able to easily cross the midline. The teacher said he was proud of his work, could speak in complete sentences and was able to look her in the eye. One student who was struggling

to cross the midline by week six was assessed to be less scattered and awkward. The student's handwriting was becoming legible. As their movements became more fluid, the teacher believed there were correlations between the Brain Gym activities and their improvement in reading and math. They were able to read more independently and their math skills increased.

The hyperactive 7-year-olds were: jumping, falling down, falling out of their chairs and were unable to balance on a physio-ball. In contrast, another student who was on Aderol for ADD/ADHD was very weak in the arms and not able to perform the arm exercises. Compensation across the midline was also noticed when a student would move his paper to one side of his body while writing or would reach across the paper to write. As the study progressed seven students improved, while three made no improvement. Being more independent in their actions was just one of the positive changes noted. One child began using the exercises on his own, while another had more control of his body and became more focused.

Speech difficulties in the form of blurting out, humming, and using baby talk were problems described by the teachers of 8-year-olds. They also noticed hypoactive behaviors (Masgutova, 1999 & Goddard, 1996) such as: not able to sit up, lying on the desk, inability to stand up while doing the exercises, having no energy and being too tired to do the exercises.

In the 8-year-old group, the teacher noticed one of the students had low stamina and was resistant to doing the exercises. During the second week he was weak and lethargic and by the fourth week he needed to lean on something and fought the exercises. However, beginning the fifth week, the student was feeling more comfortable in his body

and by the following week the student was able to cross the midline easily in all three dimensions.

Another student who was lying on the desk and not able to sit up began improving by the third week and by the seventh week was able to cross the midline with subsequent improvement in the ability to perform work in the classroom.

In this group of students with physical difficulties three of the students showed no improvement. At the end of the eight weeks they were still blurting out, using baby talk and being over-talkative. All had emotional problems and couldn't do the exercises.

In 9-year-old students, low stamina and being lethargic were reasons cited for the inability to cross the midline. Teachers described these students as being uncomfortable in their body, having to spin when doing the exercises, or being stuck in their space. Hyperactive behavior was described as being too talkative, always on the move, too involved and not able to sit still. By week five, the student who was uncomfortable in his body, who responded by acting silly and who could not following directions, began improving by showing more effort and desire to focus on schoolwork. Week six teacher comments illustrated big changes for the student in improved handwriting, spelling and over all motivation. The student felt more comfortable in his body and was able to cross the midline easily.

A student who could not cross the midline did not improve until week seven and then began to be more comfortable doing the exercises. He was able to cross the midline easily and "relaxed into learning" which meant he wasn't worried about getting his lessons completed perfectly.

Hyperactive behavior changed for another student by week three when he began to cross the midline. By week six, he could cross the midline comfortably and complete assignments on task. The teacher said she enjoyed having him in the class. Then home issues made him less secure and in week seven he was fidgety, couldn't focus and had problems with behavior.

A 9-year-old student showed no improvement throughout the eight weeks and was not able to cross the midline. The teacher noticed he continued to be very talkative and acted silly. In addition, he was lethargic when doing the exercises and had to spin to keep his balance. Barkley (1997) discusses speech problems, such as talking constantly, as one of the factors in children labeled ADHD.

In this group, two 10-year-olds had opposite reactions. One started by leaning back on his chair with his feet out and by the fourth week was lying on his desk with his arm hanging down to the side. But by the seventh week the teacher commented he had excellent posture and was leaning forward to hear. This continued during the last week of the study. In contrast, a different teacher reported that during the first week another student was lethargic and continued the rocking back and forth motion for the duration of the study. She commented that he couldn't get out of this ultra-relaxed pose, that the student after eight weeks could not cross his legs comfortably while doing the exercises and was a constant talker.

Another student always pushed his paper to the left side of his body, would only sit in his chair and would not sit on a therapy ball. Throughout the study he made some improvement but remained in the low range of functional ability.

The last student was one whom the teacher described as having "horrible" behavior. He was on medication and did not want to participate in the study activities. By the fifth week his student evaluation progress marks had dropped in all areas. At the seventh week he still did not want to do the exercises. He could not cross his legs comfortably and talked constantly. There was no change in focus but the teacher noticed his behavior had improved.

In Figure 16 the "Physical Behavior Performance" chart summarizes students who were identified by teacher comments, on the student evaluations, as having physical challenges in the classroom that affected their academic performance. This chart illustrates students' overall performance during the study as low, medium or high. It was created by:

- Selecting 31 students from the 63 who participated in the study that exhibited physical behavior problems such as falling our of their chair, not being able to sit still or reaching across their paper to write.
- Each of the 31student's totals for Posture, Focus and Behavior was summed for his or her participation in the study over eight weeks.
- Then the sums in each of these categories were examined for the low and high measurements.
- A scale was created to outline low medium and high performance by subtracting the lowest score from the highest score. Then taking that sum and dividing it by three provided the average points between the performance measurements. That average was then added to the lowest score and subtracted from the highest to obtain ranges.

Posture, Focus and Behavior for Students with Physical Challenges Scale

	Posture	Posture	Focus	Focus	Behavior	Behavior
Low	188	345	154	322	159	326
Medium	346	503	324	492	327	494
High	504	659	493	658	495	661

Table 2

- Each student was then scored low, medium or high performance in Posture, Focus and Behavior.
- The percentages of student performance in Posture, Focus and behavior is summarized below in Figure 16:

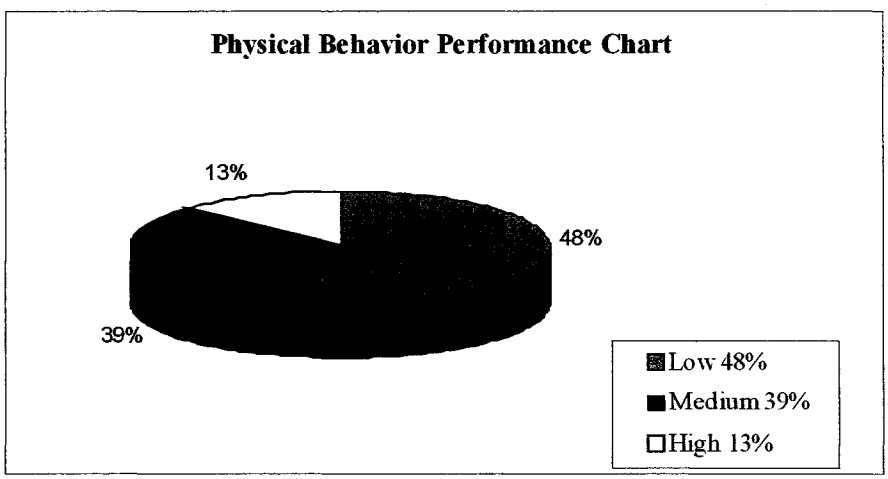


Figure 16

The summary of the analysis of children who displayed physical problems during the study is that:

- Four students (13%) out of 31 performed high overall in all three exercises.
- Twelve students (39%) out of 31 performed medium overall in all three exercises.
- Fifteen students (48%) out of 31 performed low overall in all three exercises. However, only three students with physical challenges saw no overall improvement when compared to the data of the whole group.

- Three students were low in Posture but medium in Focus and Behavior.
- One student was low in Posture and Focus but medium in Behavior.
- One student was medium in Posture and Focus but low in Behavior.

Focus Groups

In this study, the data were generated from teachers who lived in different parts of the country and taught in diverse types of schools. This process involved group interviews (Patton, 1990, p. 17) with teachers who had participated in the study. Out of the 16 American teachers, ten participated in three separate focus groups held in Colorado, New Mexico and Minnesota. The data from the three focus groups was triangulated, compared to each other and then summarized.

Three mentors and I directed the focus group interviews (Greenbaum, 2000). The mentors were from New Mexico, Minnesota and Georgia; they had previously assisted me in collecting data for the study. To keep the data consistent, we used the same open-ended questions for all three focus groups and recorded the answers using a tape recorder and writing down the information. The information was then transcribed verbatim and recorded according to the questions. Patton (1990, p.468), describes this as a process of "triangulating through multiple analysts," by having two or more people analyze the same data.

These themes emerged from the questions:

- The changes the teachers noticed in posture, focus and behavior during the study.
- Teacher and student reactions to doing the exercises.

To explore the themes in depth, the answers from the teachers in the focus groups were compared with the student evaluation information, which included student data and teacher comments. To understand the similarities and the differences in the information presented by the different groups, let us look at the four themes individually.

Changes Teachers Noticed in Posture, Focus and Behavior

Comments on Posture from Teachers in Focus Groups

Teachers who participated in the focus groups had the following observations about posture. In the beginning of the study they noticed rigid bodies, slouching and slumping over the desk and an inability to integrate the top of the body with the bottom of the body. Before the study, Minnesota teachers noticed there was a correlation between muscle tone, midline problems and coordination. Toward the end of the study Colorado and New Mexico teachers noticed children sitting up and holding their heads straight where they had previously slouched at their desks. Colorado teachers also noticed that fewer injuries were occurring on the playground. During the study, teachers confirmed these statements. They observed that once the students were able to cross the midline and could define their personal space, their work habits improved and behavioral issues were less of a problem.

Comments on Focus from Teachers in Focus Groups

The focus group teachers in Minnesota observed improved reading skills, higher test scores and students were more task-oriented. In the beginning of the study New Mexico teachers noticed two extremes: 1) Students were over focused and always trying to please or 2) students were withdrawn and afraid to speak out. After the study,

teachers noticed students were able to ask questions, stay on task and were taking exercises home to practice and teach others. Colorado teachers observed students doing their work independently and noted improvements in hand writing. Not only did the students' hand writing skills improve but they were also able to write longer, more descriptive stories.

Comments on Behavior from Teachers in Focus Groups

The Minnesota and Colorado teachers in the focus group and their students noticed a higher level of calmness in the classroom when they did the exercises. New Mexico teachers reported a decrease in emotional outbursts and more emotional control in the students when they were having problems at home. They noticed an increase in self-confidence and independence among the students.

Teacher and Student Reactions to Doing the Exercises

Student Reactions

New Mexico teachers reported that while they noticed academic improvement in math, the students made more significant improvement in reading. Abstract thinking and social skills also increased in some of the students. Colorado teachers remarked that some of the students asked to do the exercises when the teacher forgot. Teachers noticed the students doing the exercises independently. However, one of the Colorado inner-city schoolteacher's noticed that two of her 11-year-old boys thought the exercises were silly and did not continue them after the study concluded.

Teacher Reactions

The teachers in the focus groups remarked on how the exercises gave them energy and that they were not so tired at the end of the day. Colorado teachers felt the exercises made them better teachers, as they weren't so scattered and crazy at the end of the day. They noticed the classrooms became much calmer and when they forgot to do the exercises, the hyperactive behavior increased. New Mexico teachers said the exercises became part of the daily routine. Teachers felt more confident in their teaching skills because they were more aware of their own bodies and what was going on in the students' bodies. They had higher levels of concentration and more energy throughout the day.

CHAPTER 8: CASE STUDY FINDINGS

Since 1990, I have used several different types of developmental studies to understand the phenomenon of the ability to cross the midline of the body and how it relates to the ability to focus, to have physical balance in the body, and the ensuing behavioral changes. Each of these opportunities has contributed to the development of the case study of this dissertation.

Chronologically, as I examined the observations of the teachers in the midline movement classes and the pilot studies identified earlier in this dissertation, I was aware of how each one added to the perspective and depth of this case study.

During this case study, I learned that the teachers were the backbone of the study. Completed observation forms and additional comments allowed me to have a complete picture of the students' participation in the study. This information led me to a deeper understanding about using movement exercises and how it affects academic performance. The validity of the data was directly proportional to the time teachers spent observing the students.

The purpose of this dissertation was to discover how the concept of the midline was important to students who have trouble with posture, focus and behavior in school. In addition, I wanted to learn if the teachers' experience in using midline exercises in the classroom was relevant to students' process of focusing on academic subjects.

The case study originally included data submitted by 16 teachers for 70 students from 11 different schools located in Colorado, New Mexico, Georgia and Minnesota. Six

of the schools were located in Colorado, three in Minnesota and one each in Georgia and New Mexico. The Student Evaluation data and teacher comments were entered into a Microsoft Excel Student Matrix worksheet. However, because of poor attendance and/or poor teacher recording seven students were dropped from the final analysis of the data. Therefore, 63 student evaluations were analyzed in the Student Matrix: 39 were males, 24 were females, 4 six-year olds, 18 seven-year olds, 17 eight-year olds, 11 nine-year olds, 7 ten-year olds, and 6 eleven-year olds.

Following the advice of Henry Wolcott (1990, p. 56) in his book, Writing Up Qualitative Research, I summarized my findings regarding the research questions based on "what was been learned, what has been attempted, and what new questions have been raised." Below are my experiences and explanations of the charts resulting from the student matrix data of the student evaluations, responses to my original research questions, study problems and further areas of investigation.

Student Matrix Evaluation Data Summaries

As I began to explore the student matrix data, which was an accumulation of all the student evaluations and teacher comments, six major areas of investigation came to focus. Those areas are described in more detail below.

Students' Best Day of the Week

The "Best Day of the Week" chart indicates on which day of the week the students had their best performance. This chart was created by:

- Examining all 63 students to determine their best day of the week for performance for all the three categories.

- The best day of the week for each week was highlighted in the Student Matrix. Then the best day for each of the eight weeks was selected.
- The results for the best day in each of the eight weeks were summed based on frequency of occurrence and converted to a percentage. For example, teachers reported that Fridays were the best day of the week for 30 students. Since there was 63 students who participated in the study, 30 students represents 46.9% of the total student population.

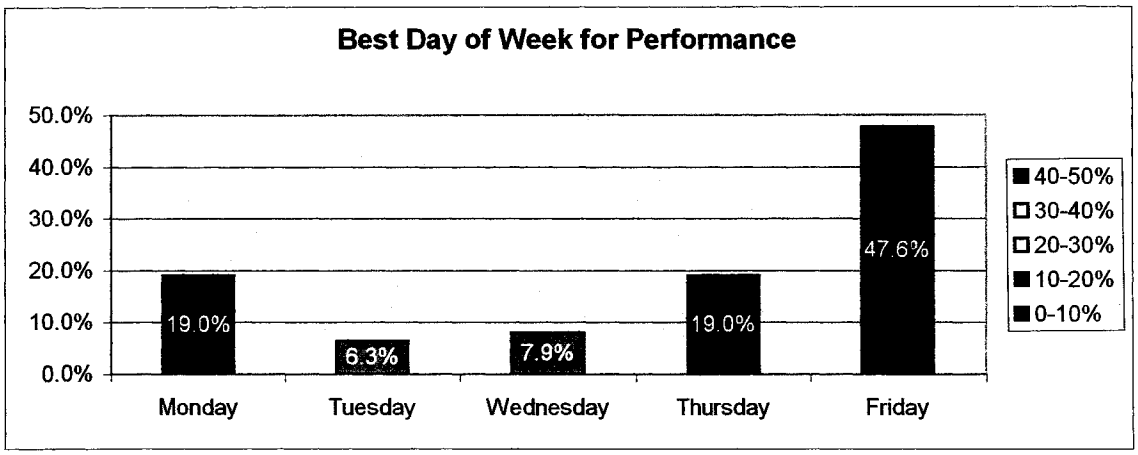


Figure 17

The teachers reported the students' best day of the week for performance as follows: 19% of the students were perceived to have their best day on Monday, 6.3% on Tuesday, 7.9% on Wednesday, 19% on Thursday and 47.6% on Friday. The American teachers in the focus groups reported a positive cumulative effect throughout the week in the students academic performance while doing the exercises daily. The teachers stated that Mondays were the most difficult day of the week and that the weekend broke up the exercise routine. They thought the difficulty was due to emotional problems at home for

some of the students and possibly the introduction of new exercises at the beginning of the week.

Therefore, in comparing the observations of American teachers and the results of the student evaluation data compared to the findings in the Russian pilot study, opinions were very different regarding the students' best day of the week for performance. The American teachers and the student evaluation data indicate a positive cumulative effect whereas the Russian teachers had a difficult time at the end of the week and more positive results during the middle of the week.

Students' Best Week of Performance

The "Best Week of Performance" chart illustrates the best week of performance for the students during their eight-week participation in the study. This chart was created by:

- Comparing the results for all 63 students.
- Each student's best week of performance was highlighted in the Student Matrix during his or her participation in the study.

Then each week's results were added up and given a percentage. (Note. Not all 63 students completed all eight weeks' of the study.)

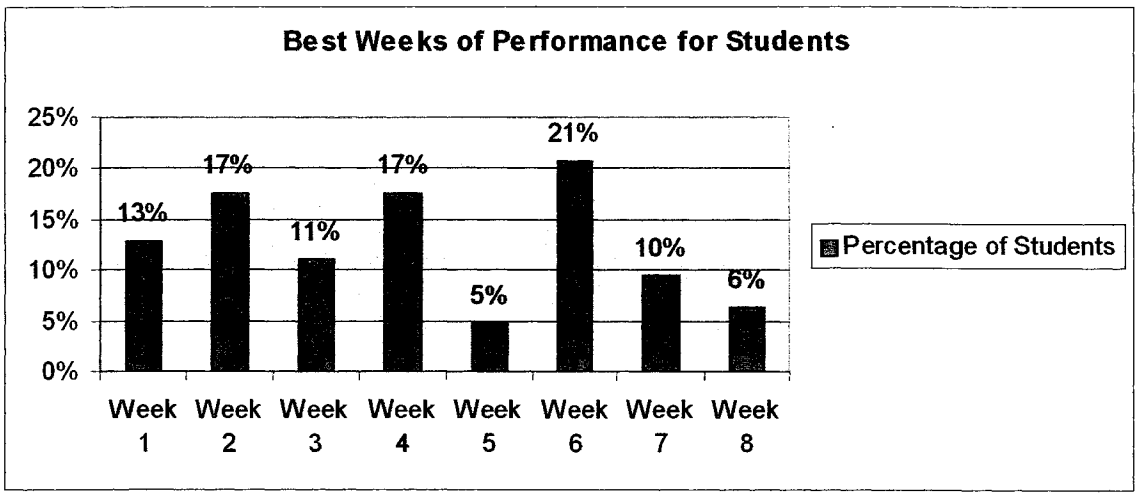


Figure 18

As illustrated in Figure 18, the teachers reported students' best weeks of performance weeks to be two, four and six. I thought this chart was interesting because it illustrates the learning curve students go through initially learning a new task and then subsequent drops and gains as the body readjusts to new skills. In my experience this reminded me of the body's physiological response to new information or stress. The body takes in new information and responds. But then the body hits blocks, perhaps physical or emotional and tries to assimilate the change and may experience a temporary drop in performance. As the body adjusts to the change, performance may improve (Erickson, 2002 & Dennison, 1996). This pattern is also seen in Figures 20-23, which are the weekly performance charts by age group. Classroom teachers who are aware of this variability due to physiological adaptability may benefit in being able to adjust to the individual student's need while he or she is learning.

Average Age of Performance

The "Average Age of Performance" chart summarizes all 63 students average performance by age in each of the Brain Gym exercise categories on the Student Evaluation: Posture, Focus, and Behavior. It was created by:

- Grouping the students' data by age.
- Totaling performance measurements by age group for Posture, Focus and Behavior.
- The age sums for Posture, Focus and Behavior were then divided by the number of students in each age group to obtain average scores.
- This information was then converted into the chart below for examination.

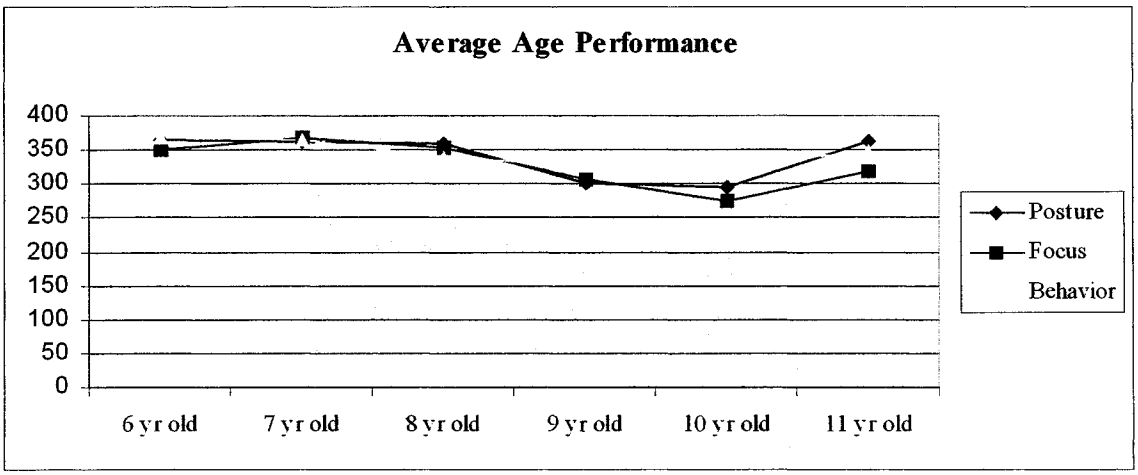


Figure 19

This chart reflects what was happening in the classroom. The results for 6, 7 and 8-year-olds' performance in posture, focus and behavior remained consistent. There was no noticeable difference between posture, focus and behavior during the study. Crossing the midline data from this graph illustrates that as posture improves, i.e. the ability to cross the midline, focus and behavior are also improving. Interestingly, 9 and 10 year olds demonstrated a slight difference between behavior improving but posture and focus being

slightly lower. The 11-year-olds showed the greatest improvement in posture, focus and behavior.

Students Weekly Progress

The five "Weekly Performance During Study" charts below reflect each student's weekly performance over the eight-week period of the study. I compared the following age groups: 6 and 7-year-olds, 8 and 9-year-olds and 10 and 11-year-olds. Please note there are two charts for the 6 and 7-year-old age groups because there were 18 students. This chart was created by:

- Selecting a group of 29 students who participated in the study using the following criteria:
  - The students had to complete all eight weeks of the study, and
  - Their teachers had to use consistent recording on the Student Evaluation forms.
- The 29 students were then grouped by age.
- Each student's weekly performance in all the exercises were totaled and logged into the Student Matrix.
- Then each age group's results were charted over the eight weeks of the study.

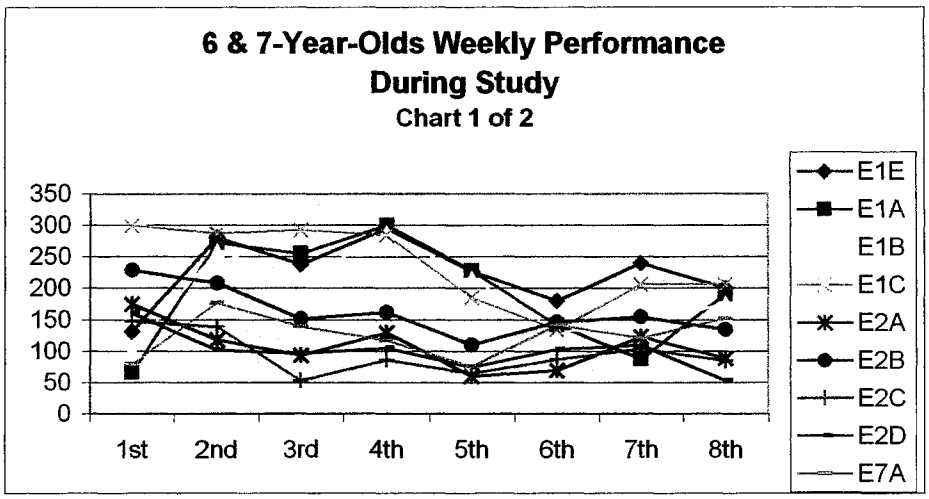


Figure 20

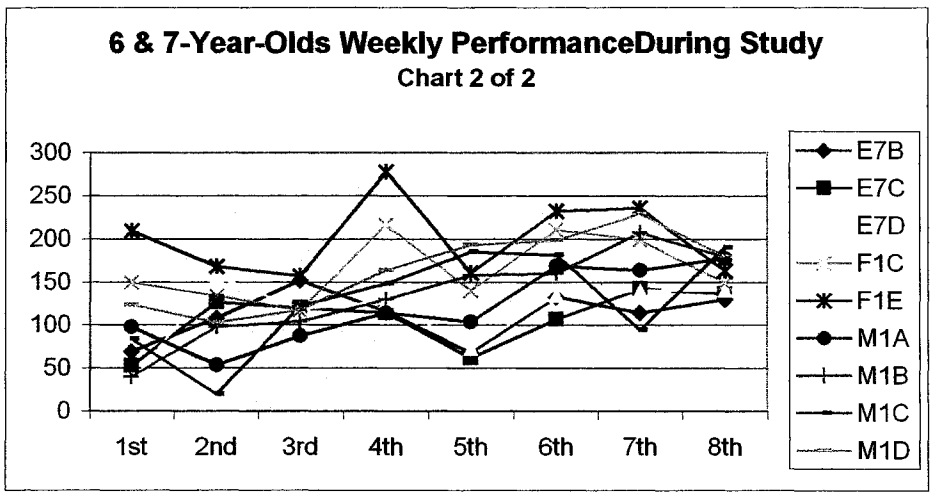


Figure 21

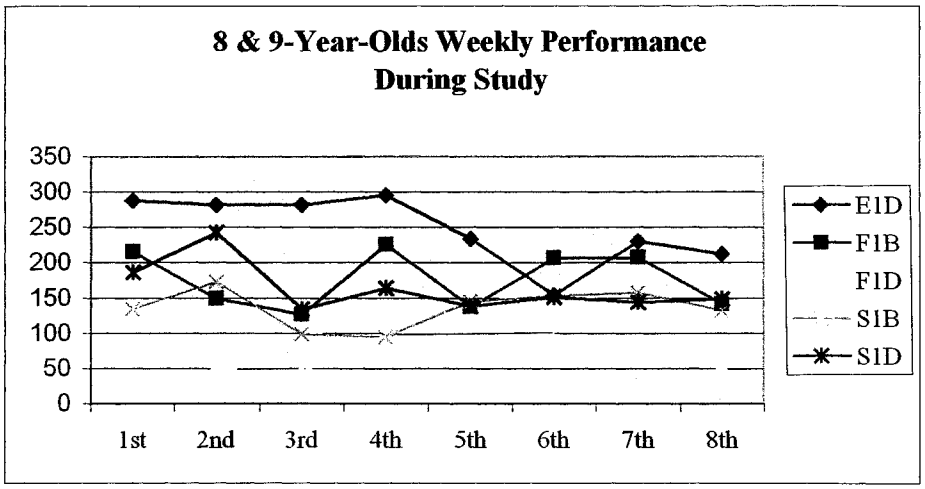


Figure 22

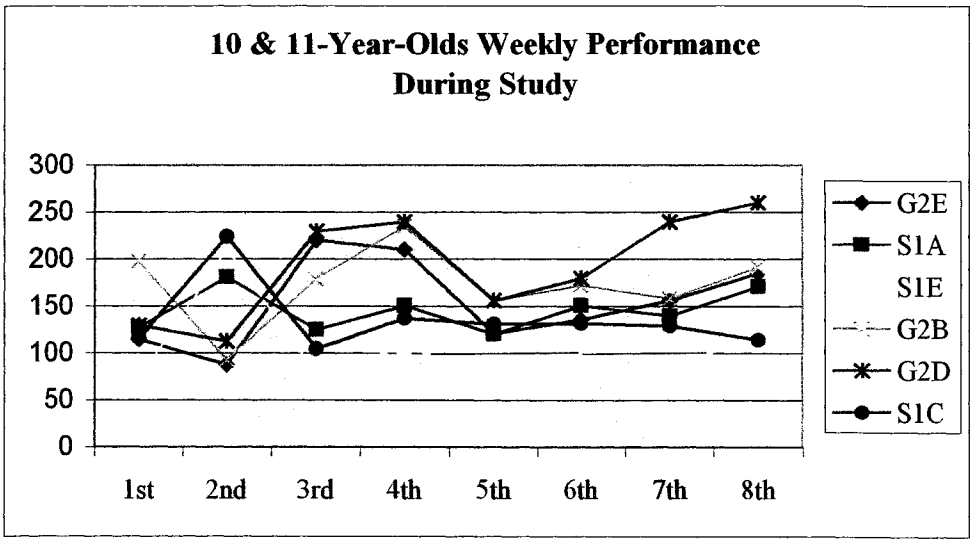


Figure 23

These charts are very similar to Figure 18 for the students' best week of performance because they further illustrate that students' performance during the study was varied.

Student Performance in Posture, Focus and Behavior by Age Group

The four charts below reflect "Posture, Focus and Behavior Performance" charts by age group over the eight-week period of the study. Please note that there are two

charts for the six and seven age group because of the number of students. These charts were created by:

- Selecting a group of 29 students who participated in the study using the following criteria:
  - The students had to complete all eight weeks of the study, and
  - Their teachers used consistent recording on the Student Evaluation forms. The 29 students were then grouped by age.
- Each student's weekly performance in all three categories were totaled for eight weeks and logged into the Student Matrix.
- Then each age group's scores were totaled and the results were charted so that the viewer could see their Posture, Focus and Behavior measurements.

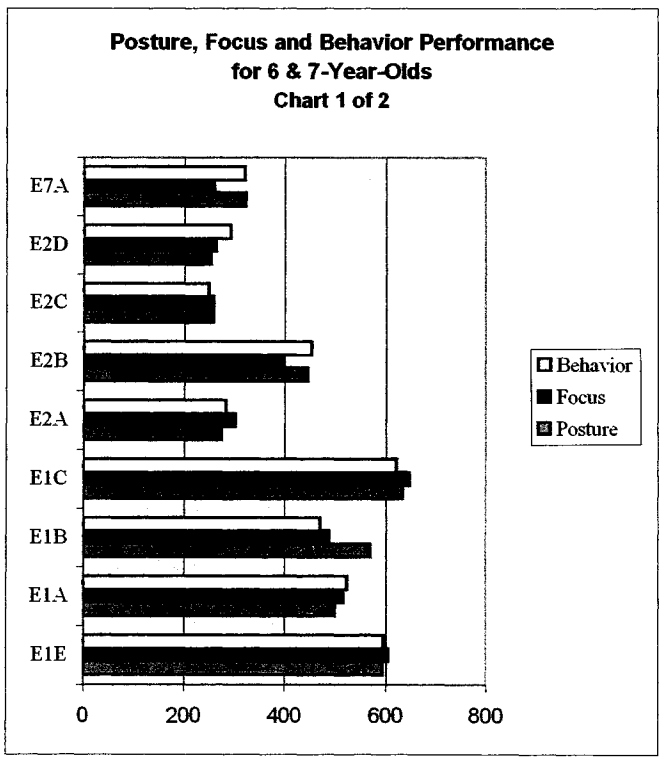


Figure 24

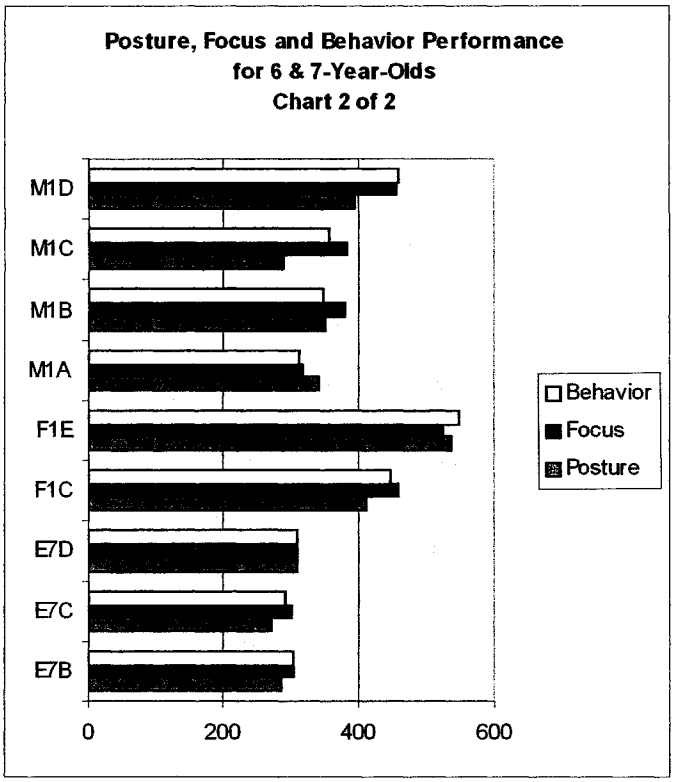


Figure 25

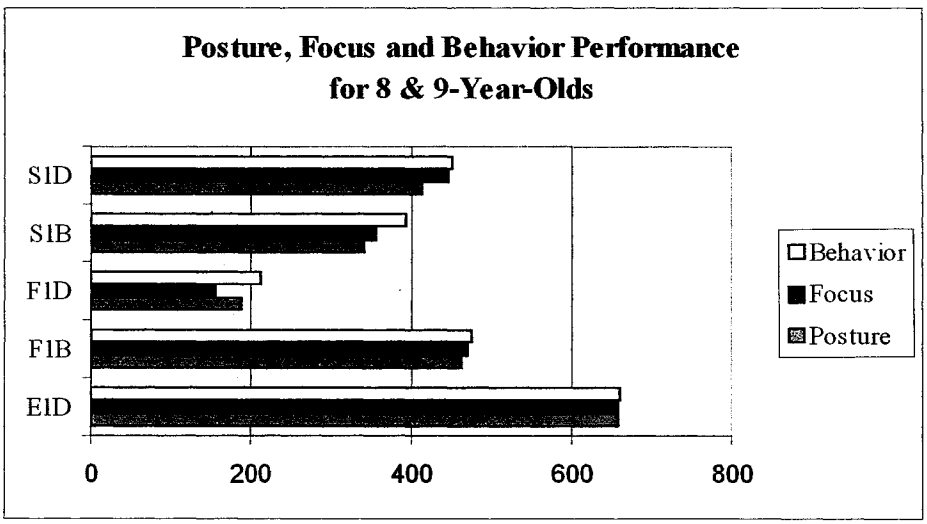


Figure 26

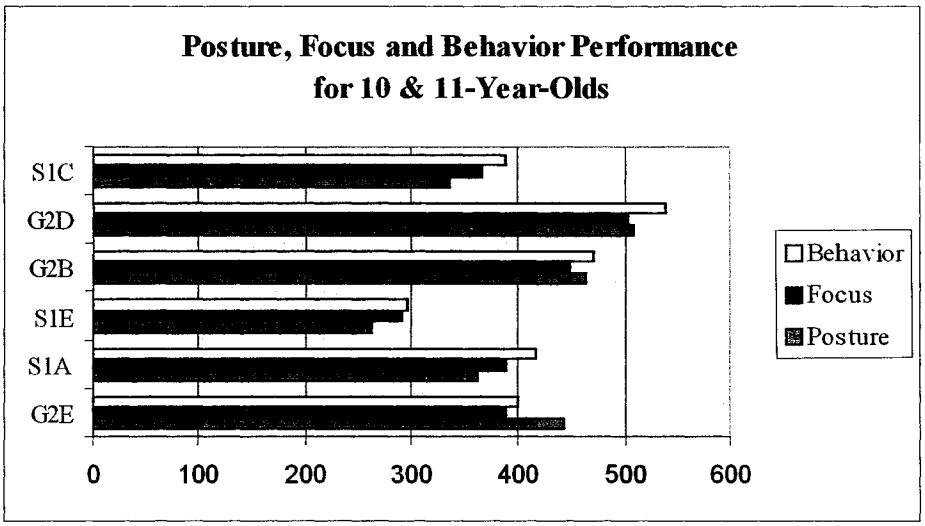


Figure 27

The student evaluation data results for posture, focus and behavior illustrate that these measurements were consistent and interrelated. Posture, focus and behavior were interrelated in that when posture went up focus and behavior followed. Consistency occurred in that posture, focus and behavior measurements always followed each other in all the students. For example, when posture was low so was focus and behavior. There were a wide variety of combinations but there was no notable difference that I could see between any of the measurements. Posture, focus and behavior measurements remained close in the scale.

Overall Student Performance

The "Overall Student Performance" chart illustrates how the 63 students performed throughout their participation in the study. It was calculated by:

- Totaling each student's data measurements in the Student Matrix for Posture, Focus and Behavior for the duration of the study.

- Then comparing the teacher comments to the weekly totals to determine if the student improved or not.
- Then each student was marked to indicate no improvement, dropped in improvement, had varied improvement or improved.
- All 63 students were analyzed in the same fashion and the resulting information was entered into the chart.

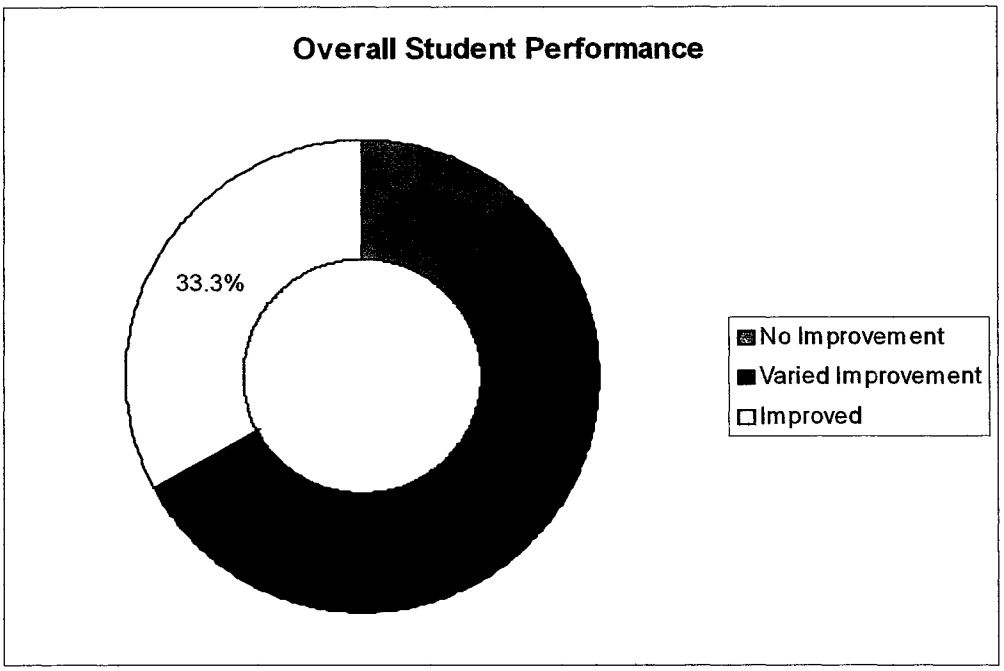


Figure 28

In summary, eight or 12.7% of the students studied either had low or no improvement in their academic performance while completing the Brain Gym movement exercises. Twenty-one or 33.3% of the students showed improvement and 35 or 55.6% of the students showed varied improvement. Varied improvement meant that the student's performance was up and down during their participation in the study. This varied improvement was reflective of the body's ability to absorb information and

assimilate it into the body. The most common variation observed in student performance was that students would do well initially and then drop the 3rd week of the study only to pick up again during the 5th week of the study. There were eight students during the course of the study that had no improvement, five did not have physical challenges and three had physical challenges. In addition, of these students with no improvement, seven were males, one was female, three students were 7-years old, three were 8-years-old, one was 10-years-old and one was 11-years-old.

Attendance

Poor attendance, holidays, illness, emotional problems or stress at home were some of the factors identified as obstacles to performing the midline movement activities, contributing to behavior problems and decreasing academic performance. One teacher remarked that her student made consistent progress in all dimensions until a holiday break, which was followed by poor attendance the last three weeks of the study. Poor attendance impacted the student's performance with the Brain Gym exercises and academically. When I examined the student evaluation data regarding irregular attendance, results were varied regarding performance of BG exercises because students are in a constant state of adjustment and relearning. Several teachers made comments such as, "students do well with the exercises when they are consistently in school."

Below is a chart that summarizes student attendance during the study. In summary, of the 63 students who participated in the study 7% of the them attended five weeks or less, 11% attended six weeks, 33% attended seven weeks and 49% attended all eight weeks of the study.

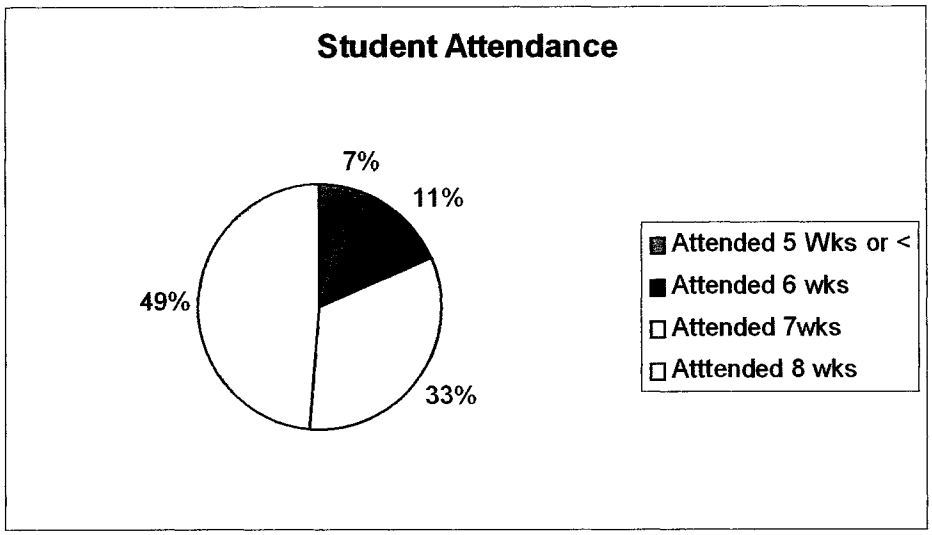


Figure 29

Students who experienced stress at home also often exhibited behavior and focus problems. Some of these students showed significant improvement in focus and behavior when they had regular attendance at school, support from the teacher and they completed all the midline movement activities. An example was one student who had significant emotional problems resulting from difficulties with her home life. She demonstrated consistent attendance and showed significant improvement in both the exercises and academics throughout the study.

Research Question and Conclusions

Research Questions

My original research questions were:

1. How is midline movement training implemented and perceived by teachers and their students?
    a. What are the teachers' impressions of doing midline exercises for themselves?

b. What are the teachers' impressions of the students' feelings about doing the midline movement exercises?

c. What changes occur in the classroom at the time of doing the exercises?

d. What factors prevent teachers from using movement-based activities in the classroom?

2. As perceived by the teachers, how does the student's ability to cross the midline influence posture, focus and behavior in the classroom?

a. What postural changes in the students are apparent to teachers as a result of doing the midline movement exercises?

b. How can a teacher's use of midline movements in the classroom help students have the ability to focus while doing academic activities?

c. What behavioral changes do teachers note in children when they can cross the midline and do the Brain Gym® movement activities?

Research Question Conclusions

As I examined the data from the student matrix, focus groups and teacher comments, in comparison to the original research questions, I came to the following conclusions regarding my research questions.

Implementation and Perceptions of Midline Movement Exercises

The teachers instructed the students to complete four readiness activities identified by the acronym PACE and three midline movement exercises related to the three dimensions (focus, centering and laterality) at the beginning of each day for the week. Then each week during the eight week study three different exercises were introduced to

the students. In the implementation of doing the exercises, some teachers would allow the students to lead the exercises for the whole class. Once the students learned the exercises, they picked their own based on their needs and used them to start new activities.

Students' perceptions of the value of the exercises were illustrated by their desire to complete them when they were taking a test or learning new skills. Other students asked to do the exercises when the teacher forgot to do them. In one school they implemented a program that helped students who were having trouble participating in the group by asking the student to leave and then choose an exercise that would allow them to focus and participate within the group activities.

Teachers noticed the development of new patterns of leadership. Students took the initiative to lead the group in doing the exercises, to do them on their own when needed for new learning and to use them as a tool for resolving behavioral problems. As previously cited, Rak and Patterson (1996) advised child counselors to develop realistic approaches to building self-concept that focused on transferable skills. Students who felt the benefits of doing the exercises inherently wanted to transfer this learning to other parts of their academic life and social order.

Teachers Impressions of Midline Movement Exercises

The overall impression teachers had of doing the midline exercises for themselves was a positive one in that they thought the exercises made them better instructors and improved their awareness of their own bodies. Some teachers reported more confidence, as they weren't so scattered and crazy at the end of the day. They were also aware of when they were over focused. The teachers had to understand this awareness in their own bodies before they could recognize a similar pattern in their students. An example was a

student who kept leaning forward in his chair and became frustrated when he had difficulty grasping a concept. The teacher noticed that she too was leaning forward and trying harder to explain the concept. Then she realized they were both over focused.

Changes in the Classroom

During the study, some teachers noticed the children having fewer injuries and altercations in the classroom. They cited that the exercises facilitated a less stressful environment because children were calmer, more at ease, and in a better frame to learn new things. Some teachers identified students who could better define their personal and other students' personal space. The teachers thought this encouraged better work habits and less behavioral conflicts because students weren't in each other space. This behavior corresponds to the ability to cross the midline and therefore know where you are in space, as reported by Dennison (1996).

Teachers noticed that students who had physical challenges and those that didn't, both became more independent while doing their schoolwork. A 1st and 2nd grade teacher remarked that students were starting their work assignments without coming up to her desk and asking questions.

Teachers that continued the exercises after the study perceived them to be an important part of the curriculum. They stated that when they did not do them there was more chaos and hyperactivity in the classroom.

Prevention Factors

Factors that prevented the teachers from doing the midline movements included the time it took to perform the exercises. In one school, teachers were having a difficult

time initiating the exercises at the beginning of the day because of all of the announcements over the school intercom. They took the "bull by the horns," shut off the intercom and retrieved the announcements later saying they needed to have uninterrupted time to do all the exercises.

Doing the exercises took time away from the curriculum. It was a point of discussion because some teachers' opinions regarding time efficiency changed during the study. At the beginning of the study, two teachers from New Mexico and two from Colorado commented on their concern regarding having enough time to fit the exercises into their daily schedule. These same teachers, at the conclusion of the study, reported that teaching time was used more efficiently when they did the exercises.

Time away from the required curriculum influenced the ability to remember to do the exercises and make them an integral part of the day. For some teachers it was cumbersome to develop this routine. For others it was easier to develop the daily routine and to make them an integral part of the curriculum.

In some classrooms, constriction of space influenced how the students could actively do the exercises. Other activities such as field days or special classes also impeded the daily practice of the exercises.

The following section summarizes the patterns that were observed in posture, focus and behavior. As perceived by the teachers, the student's ability to cross the midline directly influenced posture, focus and behavior in the classroom in the following ways.

Postural Changes

Some students did not have a well-developed understanding of where they were in space. This difficultly was accompanied by the inability to cross the midline of the body.

Some students would fall over while trying to cross the midline during the cross crawl exercises. Other examples of inability to cross the midline included postures such as lying on the floor, slumping over the desk and being too weak in the arms to do the arm exercises. At the beginning of the study some of the teachers observations included: noticing children with rigid bodies, slouching, rocking back and forth and slumping down in their chairs. Many of the younger children, 6 to 8-years-old, were identified as being awkward in their movements. Being tired and lethargic was also a problem for eight students ages 7 to 10-years-old. These postures indicated problems with integration of the reflexes into the body (Goddard, 1996; Masgutova, 1999; O'Dell & Cook, 1997). Many of these behaviors were noted in some of the 31students that displayed physical symptoms.

By the end of the study, teachers reported many students sitting straighter and holding their heads up. Some teachers remarked on a more balanced posture and the ability to cross the midline.

Ability to Focus

Factors affecting the ability to focus included but were not limited to health issues, emotional problems at home and medications. Often, when students were not able to focus, there were behavior issues that arose in the classroom.

Another factor affecting focus and why some students found success and others did not was that the students who did not make improvement consistently were not able to focus and participate in the midline movement exercises. Two teachers commented on their awareness of student medication problems and the subsequent poor ability to focus and perform the movement exercises.

In the beginning of the study, it was noted from the teachers' data that 26 students exhibited problems with reading, 8 had problems in Math, 7 had speech problems and 4 had problems in writing. This reflects teacher comments in the descriptions of the students. At the conclusion of the study, many of the teachers reported higher test scores and an increase in abstract thinking for some students. They noted academic improvement in math, reading and writing. However, these teachers thought the most significant gains were in reading and handwriting.

Most teachers also reported that some students were better able to ask questions, stay on task, were doing their work independently and taking exercises home to practice and teach others.

Behavioral Changes

One thing I observed in the student data concerned improvement in social skills, leadership and self-direction. If a student began the study with low self confidence, poor direction or self motivation and shy behavior and then as a result of participating in the exercises began to show improvements, the student would start to gain confidence and a realization of the benefits of the program. The teachers and other students would encourage and support this type of change and growth, which would encourage the struggling student even further in his/her self confidence and responsibility for learning. For example, several students displayed anti-social behavior, low self-esteem and confidence. During the 3rd and 6th week of the study, the students began to exhibit more self-confidence in their answers, in academics and began engaging with other students in small groups. The teacher would encourage these activities and provide a lot of positive feedback, which seemed to further the student's desire to continue to participate in the

midline movement activities and demonstrate leadership roles. Students being supportive of each other displayed positive social support and they took turns assuming leadership roles. The majority of teachers reported a decrease in emotional outbursts and more emotional control in the students when they were having problems at home or in the classroom.

Older boys, especially those with behavior problems, thought the exercises that were taught to all students were a joke and they laughed and misbehaved. They could not cross the midline and were embarrassed when performing the exercises in a group where they could be seen. They were uncomfortable in their bodies and did not want to do the exercises. Some of them exerted peer pressure on others to regard the exercises as silly. Therefore, I could correlate how behavioral problems developed in some students and disrupted classroom activities. One of the teachers of 11-year-old boys, who regarded the exercises as silly, did not continue them at the conclusion of the study, even though some of the girls in her class chose to continue on their own because they found them helpful before taking a test. This same peer pressure behavior with older boys was also reported in the Russian pilot study.

Another characteristic about behavior some of the teachers noted was that four of the students began to exhibit an increase in hyperactivity during the second and third weeks of the study. By the fourth week, the hyperactive behavior stopped or decreased and the students began to improve in all areas. This data were congruent with observations noticed by two teachers in the Russian pilot study discussed earlier. This improvement was often consistent throughout the remainder of the study. This may be a result of the student's inability to coordinate motor control with the reorganization

occurring in the brain, as a result of the experience of crossing the midline. Hynd et al. (1993) found there was a motor adjustment problem with hyperactive students. In their study they reported that hyperactive, ADHD, students could correct their mistakes as frequently as students in the control group but could not adjust their speed after a mistake in a stimulus response. This built on their study from 1989, which found that if hyperactive students were given incompatible instructions there was a delay in their response time, which they attributed to a motor decision problem.

Discussion

Student Performance

New research in movement and learning and why students do not improve academically indicates physiological problems in the development of the brain. The brain creates movements by sending nerve impulses to the muscles or the larynx. Each muscle gets the message at a different time. This is referred to as the space-time pattern (Jensen, 2000, p163). The part of the brain known as the anterior cingulate is active when new movements are initiated. This area seems to tie movement to learning and if movements are impaired, the cerebellum, which is connected to these other areas of the brain are compromised. Students who show no improvement are likely to have movement problems. The child who cannot sit still and who rocks back and forth is trying to integrate his body, on a primitive level, so he or she can focus and pay attention in class (Corso, 1999; Masgutova, 1999; O'Dell & Cook, 1997).

Teachers who are aware of problems crossing the midline can do testing to determine the movement needs of the students, whether it may be reflex integration, re-

patterning for whole body movement or specific exercises related to the dimensions of brain function.

This was illustrated early in the study when some teachers noticed that students who could not cross the midline often had physical expressions such as slumping or falling out of their chairs. As the study progressed these teachers noticed differences and/or improvement in the students' ability to do the midline crossing activities and that they were no longer slumping and falling out of their chairs.

Variability

Throughout the study a majority of the students, 55.6%, showed varied improvement (See Figure 28). The students' scores and the comments from the teachers reflected an uneven pattern of performance in Posture, Focus and Behavior throughout the eight weeks (Figures 24-27). This varied pattern reflects several interesting phenomenon regarding the assimilation of movement patterns within the body.

Carol Ann Erickson (2002) has worked with Olympic athletes for 30 years, training them in movement skills; she understands that the varied performance exhibited by the students is similar to an athlete who is learning a new skill. She says that variability in performance can be regarded as the pause before action, which enables them to get more efficiency from their movement. I believe the ability to focus is the same whether you're learning a motor skill or an academic skill.

Dennison (1981) also describes this varied pattern as a reorganization process in which the system needs time to reorganize and re-educate. The brain needs time to practice and make the action automatic. Depending on the resources the system has when

the practice is initiated, they can either go backwards, go forward or pause and wait for the reorganization to occur.

This also reminds me of a student who is learning vocabulary words. In order to have understanding and meaning, the brain body mechanism needs time to fit it into the broader picture. The student needs time to hear it, understand it and then integrate. The students who showed this weekly variability during the study had the new exercises introduced, the body practiced them, assimilated them into the bigger picture, then went on to reorganize and take the next step toward new learning. This variability in processing information is part of a normal pattern described in various developmental programs (Goddard, 1996; Masgutova, 1999; Odell & Cook, 1997).

To further examine this information, let us look at it from another point of view in which students with developmental problems were assessed. Eason & Surburg (1993) examined students with mild retardation. They viewed midline crossing as a function of information processing. Their results indicated, after 108 trials with similar students in two separate states (Louisiana and Indiana), that tasks, which entail crossing the body's midline, required greater time than ipsilateral (one sided) movements. They noticed that variance increased within the group. They explained this saying that midline crossing required greater neurological organization than ipsilateral movement, thus causing more variability between trials.

Comparing Student Performance

There were 32 students with no physical symptoms and 31 students who displayed physical symptoms. The average scores on the visual analog scale in Postural performance for high, medium and low were very similar for both groups. Both groups had a small

percentage of students who maintained a lack of reflex integration, which was reflected in low scores. There were eight students during the course of the study that had no improvement, five had no physical challenges and three had physical challenges.

Below is a table which reflects the low, medium and high scores in posture focus and behavior for three groups of students: students with physical challenges, students with no physical challenges and all students. There were 31 students who had physical challenges and 32 students who did not exhibit any physical challenges.

Comparison Table

Scale of performance for children who displayed physical challenges						
	Posture	**Posture**	**Focus**	**Focus**	**Behavior**	**Behavior**
Low	110	293	115	296	119	300
Medium	294	475	297	477	301	480
High	476	659	478	658	481	661
Averages	335		353		345	
Scale of Performance for students who did not exhibit physical challenges						
	Posture	**Posture**	**Focus**	**Focus**	**Behavior**	**Behavior**
Low	167	300	112	262	156	292
Medium	301	434	263	412	293	429
High	435	568	413	564	430	566
Averages	363		337		351	
Scale of Performance for all students						
	Posture	**Posture**	**Focus**	**Focus**	**Behavior**	**Behavior**
Low	110	293	112	294	119	299
Medium	294	476	295	476	300	480
High	477	659	477	658	481	661
Averages	347		343		352	

Table 3

Children with physical symptoms had higher measurements in Posture and Focus than children who did not have physical symptoms. I believe this was because they were

focusing more actively than students with no physical challenges. Syrotyuk (2003) also supports this position and believes children who have learning disabilities show more improvement than those who have a higher level of functioning. Low-end measurement for posture and behavior in children who didn't have physical challenges was higher than students with physical challenges. This may be because they didn't have to overcompensate physically to accomplish the same task and therefore didn't have as many behavioral issues resulting from frustration. Finally, the average scores for all three groups in each category were very similar and consistent. This may indicate again, the trend that posture, focus and behavior skills impact each other. This trend may be fundamental to understanding the concept of midline crossing inhibition in students. If a child is able to move freely through these three midlines using the eyes, ears, hands and legs in a bilateral coordinated movement pattern, then as the study results indicated through teacher observations, they are able to focus on academics and act responsibly in the classroom.

Commonality

What was common to all teachers was that every teacher saw improvement in at least one of their students. What was common to the students was that they all learned new tools for learning, if they chose to use them. The teachers taught the students which exercises to use for reading, writing, mathematics, stress release, focus and so on. For example, teachers taught the students Positive Points to reduce stress before a test. Another example of commonality was that all students created an awareness of their body, either positive or negative, through participating in the midline movement exercises. Some students chose not to do the exercises because of their awareness.

Study Problems

Through the course of the study a few discrepancies were observed. There was a difference between low performance and no improvement. The data from the student matrix regarding students who displayed physical challenges (Figure 16) indicated that 15 students had **low** performance of the midline movement exercises during the study. Low performance did not mean "no improvement." Only three of the fifteen students with physical challenges saw **no** overall improvement when their data was compared to the whole study group.

A problem observed in the study was that some teachers did not use consistent recording of student performance. For example, some teachers used the same number to score each measurement throughout the whole week. As a result, there was little variation in the students' measurements. Also, some of the teachers scored the first characteristic of a category and not the second. Therefore when examining the data it was necessary, for certain areas of investigation, to only examine a group of the students that had consistent attendance and teacher recording of data. (Note. In future studies, I would need to correct this inconsistency by establishing and monitoring strict recording guidelines.)

Following the examination of the study results, I had several questions regarding the student evaluation form:

1. Were the forms explained well enough so the teachers could fill them out accurately?
2. Was the explanation to the teachers on grading the students' performance clear?

3. Was the form too inclusive or not inclusive enough? Would it have been better to have the teacher comments on another form?

Another difficulty occurred when the physical space for doing the exercises was constricted. Other concerns and problems were related to finding time in the day to do the exercises. This was true for all the teachers. However, one New Mexico teacher noticed that doing the exercises made the whole day go better and seemed worth the time. Two Colorado teachers commented that other school activities often conflicted with having enough time to perform the exercises, so they would shut off the classroom intercom early in the morning and do the exercises at the start of the day.

Areas of Further Investigation

At the conclusion of this dissertation, I realized there are many more questions to be explored. Some of those questions and areas of further investigation include:

- How does the non-integration of the reflexes in brain development affect the three dimensions?
- Would teachers benefit from learning how certain physical postures in students relate to them having academic problems?
- Would it be beneficial to students who do not respond to the midline exercises to add re-patterning type processes in the classroom?
- Can the motor development problems of hyperactive children be changed by the addition of physical exercises that cross the midline, thus eliminating the need for drug therapy?

- Is it important for teachers to use daily exercises in the classroom that help students integrate the brain?

The observations submitted by the teachers in the American case study and the Russian pilot studies have many similarities despite differences within the classroom environment. For example, comparisons between the students observed by Russian and American teachers indicated that the students who demonstrated hyperactive behavior, if they improved, the improvement began after a period of increased hyperactivity. Though in both groups they were able to focus better after a period of four weeks of doing the exercises. Also, both groups of teachers indicated that as a result of doing the exercises they felt calm and centered and they noticed the tenor of the classroom reflected their calmness.

The lessons learned from this study indicate there is a need for educators to take a closer look at identifying children who have problems crossing the midline. Some of the observations of students showed that immature development of the reflexes may be responsible for the inability to focus and maintain behavioral control (Goddard,1996 Masgutova, 1999; Odell & Cook, 1997).

Children may intuitively understand that movement and coordination of the muscles are essential to their academic growth. In the study, teachers observed that many of the students reminded the teachers to do the movements and wanted to lead the exercises for the whole group. Independently, they chose the movements they needed for their academic subjects.

As educators, I believe it is our responsibility to acquire the knowledge that observes and understands, but does not label these physical behaviors. Instead the

importance of movement activities integrated into the classroom could be an integral part of teacher education. It may be found that this process will solve some of the focusing and behavioral problems in the classroom.

In Russia, Dr. Arturo Petrofsky, former president of the Russian Academy of Education, provided this insight when we discussed the works of I.M. Sechenov and Russian education today – "It is our responsibility," he told me, "as educators to invite a child to create a peaceful world in which to live." As an educator, I believe we can do this by understanding the unique strengths of each child.

APPENDIX A

Attention Deficit Hyperactive Disorder

As an educator and a parent of 6 children who went through the school system, over the years I have been aware of the increase in the number of children being diagnosed with the symptoms of Attention Deficit Disorder or Attention Deficit Hyperactive Disorder. In my clinical practice with children who have learning challenges, more and more parents are coming to me because their children have been diagnosed as having possible ADHD by the educational system. Many parents will use medication to alleviate the condition but then there are other parents who are looking for alternative solutions. They wonder about the use of and the long-term problems associated with stimulants such as Ritalin, Prozac or Cylert, medications typically prescribed by doctors for the disorder. This is a difficult issue for parents because they feel pressured by the schools to use medication for their children so they can stay in the regular classrooms instead of being put into special education programs. For example, the Director of Special Services in the Douglas County, Colorado School District, calls ADHD a "garbage pail" term. She explains that because teachers often tell parents "Your Child has ADHD" she is teaching a class for teachers, teaching assistants and interested parents. In this class they identify problem behaviors and behavioral management techniques. She believes doctors and psychologists are too quick to prescribe stimulants for problems that can be managed in the classroom with assistance from parents.

Attention Deficit Hyperactive Disorder, (ADHD) as it is now identified, is the fastest progressing disorder of children in the educational system. The number of

American children, who are diagnosed with this disorder, has grown to nearly five million, or 6% to 10% of the population, Jennings (2000). With over 3,000 articles written about it (Barkley, 1990), ADHD is one of the most researched maladies of our time. Prolific coverage on television and radio has also made this one of the most widely debated topics in education today.

History of the Disorder

Though recently named and popularized in the last 20 years, the history of this disorder reaches back to the 1800's. At that time, hyperactive and inattentive behaviors were identified in patients suffering from serious brain traumas but it wasn't until 1902 that a researcher, G.F. Still, diagnosed a childhood disorder known as "Defect in Moral Control." This disorder included impulsivity, inattention and difficulty in benefiting from life experiences. This condition, he said, occurred more in males than in females and he believed it was related to heredity, trauma and learning history. He felt there was little to be done in remediation of this condition (Adams, 1992).

The neurological connection began to be developed in the early 1900's when an outbreak of encephalitis caused the affected children to become restless, impulsive, and overactive. This disorder was then called Minimal Brain Disorder (MBD) and was referred to in these terms until the 1950's.

Further involved investigations led to many sub-labels including Attention Deficit Disorder (ADD) throughout the 1970's and 1980's. In addition to ADD, Attention Deficit Hyperactive Disorder (ADHD), is another term used to label children with this disorder. This term was printed in the 1994 Diagnostic and Statistical Manual of the American Psychiatric Association.

School Determination of ADHD in a Student

In Colorado, for the purposes of obtaining special education services it is not necessary to have a medical or mental health diagnosis. As a result of a "staffing meeting," which includes school professionals and parents, four possible results may occur:

1. The student may qualify as being physically disabled.
2. The student may qualify as having a perceptual communicative disorder.
3. The student may qualify as having a significant identifiable emotional disability.
4. The student is not eligible under any of these categories, in which case he is referred back to the teacher.

Any reference to the first three qualifiers indicates that a student is eligible for special education services, which can continue until the student is 21 years old. The school must then prepare an Individual Educational Plan (IEP) for the student detailing the procedures for "appropriate education" (Adams, 1994).

Parental Responsibility and an ADHD Diagnosis

With the growing recognition of ADHD as an emotional problem, new articulation of laws, govern the rights of individuals. As a result, courts are saying that parents have a legal duty to provide treatment for ADHD as part of their general obligation of medical care for their children. Since schools are required to provide education up to the age of 21, parents may also be required to provide education and support until that age. In divorce cases, the obligation to make child support payments may not end when the child reaches 18 year of age (United States Department of Education, 1992).

For example, in Pitts vs. Pitts (Aleman, 1994) the court considered the therapy, medication, tutorial and transportation costs incurred because of an ADHD child in fixing the amount and duration of child support obligation. This support went beyond the child's 18th birthday because of delays in education attributable to ADHD.

ADHD is also considered in the awarding of a child's custodian. One case of interest involved the revoking of custody for a child who had been labeled ADHD in kindergarten. This changed circumstances and the court decided that the father was now better able to handle the financial and psychological demands of the child (see Donald K. Eidert, Aleman, 1994).

The case of Moon vs. Moon (Aleman, 1994) upheld that a father, who taught his son, who was labeled ADHD, to work with his hands and sought to reinforce his self-confidence and instill a love of nature, was awarded custody in preference to the mother who sought to assist him with his homework. The court stressed both parents were suitable.

As children grow into adulthood and ADHD continues to be a part of their lives they may also be protected in the workplace under the Americans with Disabilities Act. Numerous court cases have used ADHD as a basis for changes in the workplace which include providing or modifying equipment or devices, job structuring, part-time or modified work schedules, reassignment to a vacant position, adjusting or modifying examinations and training materials, and providing readers or interpreters. The effects of ADHD may also lead to workman's compensation. The case of McGarrah in 1989 (Aleman, 1994) held that workplace stress was a compensable occupational disease and that ADHD was not excluded from the list of mental disorders. It appears that if ADHD

is aggravated by work stress or if ADHD and stress work together to produce another disorder such as depression or substance abuse then a person may be awarded workman's compensation.

Other court cases have addressed whether a person who is diagnosed with ADHD may be held responsible for criminal behavior. Many court cases also lessen the sentence to be imposed because of the implication that the person is not responsible for his/her actions (United States Department of Education, 1993).

Drug Therapy and ADHD

Ritalin, the most common drug prescribed for ADHD is classified as a stimulant, which has a subduing effect on children. According to the National Information Center for Children and Youth with Disabilities (NICHCY) policy briefing paper of 1994, the drug acts to stimulate the action of the neurotransmitters of the brain to better regulate attention, impulse, and motor behavior. Classified under Schedule 2 of the Controlled Substances Act along with cocaine, morphine and opium, this drug is labeled as most restrictive and must be closely monitored by a physician.

Some of the questionable side effects of taking Ritalin include: loss of appetite, reduced growth, depression and the negative effects on the immune system. Other side effects include: stomach pains, weight loss, irritability, and social withdrawal. Doses of the drug usually range from 5 to 20 mg and last for four to six hours. Over medication can cause tic disorder, hypertension, and rapid heartbeat. Withdrawal symptoms associated with the drug include: depression, exhaustion, social withdrawal, irritability,

and suicidal feelings. The drug affects the basal ganglion and the corpus stratum, the brain areas responsible for motor control and sense of time (Hannaford, 1994).

Yet even though these side effects are well documented, the NICHCY briefing paper referred to above stated that "in general the short acting stimulant medications (e.g. Ritalin, Dexedrine, Cylert) have few and mild side effects (Fowler, 1994).

Teachers' Role in Using Other Methods for Students Labeled ADHD

I interviewed an occupational therapist that had been with the Jefferson County School District as part of the Special Education Team for elementary schools for the past 12 years. She goes to many schools in the district as part of her routine and sees 75 or more children throughout the district.

What she has observed in this period of time is an increase in the number of children who are classified under the label ADHD. She says, "there is an increase in the intensity of the problems in the individual children which she personally attributes to high stress in the environment, food allergies and the change in philosophy of parents in regard to the care of their children, namely in the administration of drugs as a solution to the environmental and personal stresses."

The process she participates in for the Jefferson County Schools uses the teacher as the first step in identifying the learning challenge with the student. The teacher confers with the parent and obtains a history of the child. Often, the parent is already aware of the learning difficulty. The teacher and the parent confer and changes may be made in the classroom to increase the learning capacity of the student. She referred to strategies such as preferential seating, working with a buddy, the teacher giving close contact to help

keep the child focused, continuous reinforcement and providing different centers of learning to which the student can move about freely.

If the learning challenges still persist then the teacher or the parent can request an intervention with the complete team. This consists of the social worker that takes the complete history of the child and the special education teacher who does academic testing and notes the degree of distractibility evidenced in a one-on-one situation. Fine motor testing is done by an occupational therapist and the adaptive physical education teacher evaluates large muscle testing. Once these tests are complete, a full staffing is held which includes the Special Education team, the parents, and the teacher.

Some classroom teachers use unique methods of keeping all their children involved in learning without the use of drugs. One example is a 26-year veteran in the Denver Public Schools, who teaches at an inner city school. The school is located in the southeast part of Denver with 474 students and includes 4-year-olds and Kindergarten through fifth grade. None of the students are bussed except for nine Special Education students. The parents pick up 20% of the students while the remainders walk to their homes. Its population is a mixture of largely Hispanic which number 65%, White 26%, Asian 6%, and the rest, American Indian and black.

Many of the parents were married at a young age so the median age of the parents is under 30 years old. It is considered a low-income community because 60 % of the students are on the free lunch program. In most families, both parents work and as a result it is difficult for the teachers to elicit parental participation in school activities.

Because of teacher concern regarding the needs of different types of students in the population, the school has adopted a policy with input from parents that students will

stay in their assigned classrooms and individual classrooms are set up to address the diverse needs of the students. As a result, teachers divide classrooms with input from the parents into 1st though 3rd, 4th and 5th and 3rd through 5th combinations. In addition to regular classrooms, there was a combined bilingual classroom for children who do not speak English with English speaking students. There was also an adaptive classroom for those with special needs.

Another teacher who had a combination classroom expressed her personal feeling that there were fewer students labeled ADHD at her school because parents did not have the money to buy medication for the students. Therefore, the diagnosis is not considered and other interventions were given priority.

At the Adams 12 school district, a teacher was in the educational field for approximately 25 years. She was a reading specialist, a classroom teacher, and a principal. Her experience with younger children in the pre-kindergarten to third grade level lead her to believe that there are many more environmental influences upon children today that influence their ability to learn. She cited the preponderance in her area of only one parent in the home to be a major stress. Another problem she saw with young children was the stress caused by television both as a violence model and as a precursor for instant solutions to problems.

As an example of the dilemma faced by teachers, she cited the case of a boy in her first grade class whose parents had him on Ritalin to control his violent behavior. While on Ritalin she said, he was a zombie but when not using it, he proceeded to hit the other children. The problem was what to do when the drug allowed him to be in the classroom even if he wasn't acting normally. Many parents don't want their children in special

education and would rather have them on a drug in order to stay in the regular classroom. She felt other behavioral strategies were difficult to implement with so many other children in the classroom.

Many children in the classroom and the influence it has was discussed by Breggin (1994) in his book The War Against Children. He cites a study by S. Jay Samuels and Nancy Miller from the February 1985 journal "Exceptional Children" who find no differences between normal children and those with school problems. They find all children focus their attention better in small classes with more teacher involvement. Others are under too much stress at home to focus their attention. Still others come from a home in which there is no one to teach them how to focus their control. Researchers call this "learned helplessness" without a locus of control and a psychosocial problem. Even Paul Wender, the advocate of Ritalin therapy for children, in the book, *The Hyper Active Child*, emphasizes that children who are labeled hyperactive in the classroom often do well in a one-on-one situation with the attention of an adult.

Other Educational Alternatives

For several years Howard Gardner, educational psychologist from Harvard University, has been developing Project Spectrum, the culmination and practical application of his theory of Multiple Intelligences. In his theory of Seven Intelligences, different ones are assigned a pre-eminent place based on the values and culture of a society. For example, in Western society, importance is placed on the logical mathematic and verbal intelligences, whereas the kinesthetic and visual/spatial are less emphasized. Realizing that a person possesses all the intelligences but each person is individual in his or her dominant intelligence, Project Spectrum seeks to incorporate each of the intelligences

in the learning curriculum. Gardner and his colleagues present workshops to teachers and parents throughout the country and assist them to blend these practices into the daily curriculum (Gardner, 1993).

In his book, Multiple Intelligences, the Theory in Practice, Gardner says the kind of intelligences favored and the models of intelligence provided will differ from an early age based on the culture of a child. In this contextual view intelligence is not an entirely biological or psychological phenomenon but is viewed as a potential depending on the cultural context in which it is found. Furthermore, he believes intelligence depends on the interaction between biological inclinations and the opportunities that exist in a culture. He cites the example of Bobby Fischer, international chess champion who he says may have the potential to use his spatial and logical mathematical intelligence to be a great chess player but if he happened to be born in a culture without chess the potential might not be activated.

Gardner teaches educators methods to devise a classroom rich with inviting materials, which are designed to stimulate all the intelligences. Rather than tests, students are involved in projects, which he reports are the most effective way to link to a distributed intelligence that reflects the use of all the intelligences. He believes that most productive work takes place when individuals are engaged in meaningful and complex projects, which take place over time. He takes our educational system to task when he disparages the one way of teaching and one way of learning.

What does this work mean to those who are now labeled ADHD? In discussing learning challenges, he advocates using the intelligence assessment instruments to identify strengths and give the student the opportunity to develop those strengths in a rich

classroom environment. Instead of the test results, parents would receive an essay with the student's intellectual profile and suggestions that will assist them in helping the student with their strengths and weaknesses at that stage of their development. The identification of strengths can provide an "entry point" to other areas that are difficult. As an example he cites the child gifted with narrative strength. Through stories, more difficult mathematical and scientific concepts may be introduced.

Thomas Armstrong (1987), trainer of practical application methods to use all the intelligences, reports that children who are stimulated to learn through each of the intelligences do not have learning disabilities. He discusses the importance of bodily movement in learning when he quotes Arnold Gesell who frequently said "the mind manifests itself in everything the body does." He quotes Einstein who described his thinking process as having elements of visual and muscular type. He also references the "Dean" of American psychology, William James, who talked about the "*tactil*e" quality of his learning saying that he could not visualize any letters of the alphabet but had to trace over the outline of the letters in his mind to remember them.

Ritalin and Academic Performance

Long-term studies have reported that academic performance is not affected by the use of stimulants. One example is a study conducted at the University of California at Los Angeles in the Department of Psychiatry and Biobehavioral Sciences, on the effects of Ritalin on reading skills.

The study used a total sample of 71 boys who met the clinical diagnosis of ADHD using the Conners ten point rating scale and were referred to the study by a child

psychiatrist who used psychiatric interview schedules which ruled out other disorders such as depressed mood or hallucinations (Forness, 1992).

In this sample of 71 boys, 30 of them had a pure diagnosis of ADHD and the remaining 41 had ADHD plus oppositional and conduct disorder. Both groups were evenly matched in age, IQ and minority status. After six weeks of trial in which both a placebo and low, medium, and high doses of methylphenidate (Ritalin) were given there was no difference between either taking the medication or the placebo in oral reading. The group with the conduct disorder improved somewhat on all three doses of methylphenidate in reading comprehension but not enough to be statistically significant (Forness, 1992).

Controversies Associated with the Use of Ritalin

The use of a drug to change behavior in the classroom is the crux of the controversy among professionals concerned with children. One of these well-known professionals is Dr. Peter Breggin who is regarded as the psychiatrist who has raised the most controversy with his arguments against the "drugging of our children." His books, Toxic Psychiatry (1991) and The War Against Children (1994) are part of his ongoing work to raise awareness about this issue in our country. He founded The Center for the Study of Psychiatry and with his wife, Ginger Ross Breggin, in 1992 headed a campaign against the Federal Violence Initiative, which sought to use inner city children to find a "violence gene" using psychiatric drugs and spinal taps.

Much drug use for childhood attention problems has to do with the label of ADHD as a biochemical disease (Fowler, 1994). He cites many studies and books by other researchers who find no consistent evidence for any underlying chemical or physical cause.

Having written eight books on the topic and appeared on national television many times debating the victimization of children by labeling them diseased, Breggin (1994) calls ADHD a manifestation of conflict, not a disorder. He cites the work of Diane McGuinness (1989) who calls ADHD, the "emperors new clothes" and says the problem is how to get professionals to give up the vested interest in such a powerful label. She says "we have invented a disease, given it medical sanction and now we must disown it. The major question is how we go about destroying the monster we have created. It is not easy to do this and still save face, another reason why physicians and many researchers with years of funding and an academic reputation to protect are reluctant to believe the data" (p. 278). Breggin further cites the research by Lisa Fleisher and her colleagues in which they state, "the ADD syndrome lacks supportive evidence and should be discarded" (p.281).

Much of the data for a physical basis of ADHD comes from a 1990 study funded by the National Institute of Mental Health and conducted by researcher Alan Zamerkin as cited by Fowler (1994). In this study Zemerkin cited his findings, which showed increased brain metabolism in positron emission tomography scans of adults who had ADHD in childhood. However, Peter Breggin (1994) refutes this finding and states that when the sexes were considered separately there was no statistical significance between the controls and the ADHD adults. Similarly, when the individual areas of the controls were compared with the ADHD individuals no differences were observed. Breggin accuses Zamerkin of lumping the data together to include a disproportionate number of women in the control group in order to achieve significance, Breggin argues, as a classic example of "massaging the data."

And yet those who favor the use of medication such as the national organizations CHADD, NICHCY, and advocates such as nationally known psychiatrists, Paul Wender, former head of the National Institute for Mental Health, and Russel Barkley, whose books are considered to be the handbooks for ADHD, emphasize that ADHD is a biochemical disease. They believe it is genetically transmitted and results from a chemical imbalance or deficiency in certain neurotransmitters, which are chemicals that help the brain, regulate behavior (Fowler, 1994).

Alternatives to Ritalin

Peter Breggin (1991), however, disputes the claims that ADHD is linked to biochemical and genetic defects. He cites psychiatrist Arthur Green who insists that, "all commonly diagnosed disorders of childhood can be linked to abuse and neglect" (p. 274). Breggin believes that, led by psychiatry, the mental health professions have filled the gap created by parents, schools, the society, and the government. The National Institute for Mental Health announced that 20% of children need psychiatric care. Questioning this figure, Breggin concludes that by making the child the victim, the pressure is off the parents, the family, the schools, and society. In his research, he cited the American Psychiatric Association's Diagnostic and Statistical Manual for evidence that the prevalence rates for various school-related diagnosis adds up to 57% of girls and 64% of boys. These reflect the top estimate for each disorder and don't include phobias, depression, and autism (Breggin, 1991).

If ADHD is not a disease then what are the factors that cause this increase in inappropriate behaviors in the classroom and at home? In her book Smart Moves-Why Learning is not all in the Head, Neurophysiologist, Dr. Carla Hannaford (1995) calls these

children SOSOH, "Stressed Out Survival Oriented Humans." Neurologically, she explains that stress causes an overemphasis on survival oriented brain processing at the expense of the rational limbic and cortical functioning in the frontal lobes of the brain. This lack of ability to process in the frontal lobes leads to excessive activity and difficulty in maintaining attention and focus on a task. The frontal lobe functioning controls the fine motor movement, inner speech, self-control and reasoning. This may cause the student to be erratic, ungraceful, unbalanced, and have poorly coordinated movements. She also states that ADHD is a label with no proven genetic or pathological background. She advocates non-intrusive child centered common sense approaches that allow children to take charge of their emotions and physical activity.

Implementation of Federal Regulations

The main federal regulations around ADHD stem from the 1994 revisions of the Individuals with Disabilities Education Act (IDEA, P.L. 94-142). Interestingly, it is worth noting that Congress did not include ADD (as it was then known) in the re-authorization of the act, but under pressure from advocacy groups the U.S. Department of Education reviewed public comments and clarified the responsibility of state and local school districts under the federal law for children with ADD.

ADD is covered under Section 504 of the Rehabilitation Act of 1973 (P.L. 94-112), which established new criteria for physical disabilities. This law is commonly known as the "civil rights law for the disabled" and states that no person with a disability that substantially limits one or more of the person's major life activities (such as learning) can be discriminated against. As a result of these laws, new laws concerning ADHD have also

been passed for children, ages three to five, which include them under the auspices of special education services.

The policy clarification in 1994 included procedures, which define the practices that must be followed by school districts if a child is designated, "Other Health Impaired," a category that includes ADHD under Part B of the IDEA act of 1973. Those who do not qualify under Part B may be covered in Section 504 of the Rehabilitation Act of 1973, which defines a handicapped person as someone who has chronic or acute impairments that result in limited alertness that adversely affects educational performance.

Enforcement of Federal Regulations

These requirements are enforced specifically through civil suits and hearings instituted by parents and conducted by a judge. In addition, federal funds can be withheld from schools that do not respond to instituting these accommodations. In a landmark case, the Department of Education for Civil Rights ruled that the Gaston School District of North Carolina failed to identify, evaluate, and provide the complainant's ADD child with a free public education appropriate to his disorder and thereby violated the Rehabilitation Act of 1973. As a result, federal funds were withheld from the schools (Quinn, 1994).

Impact of Federal Regulations on Colorado Law

In the light of federal regulations, increased activity in the political arena advocated by special interest organizations consisting of families and health care groups has led to legislation which puts students diagnosed as ADHD under the label of physically handicapped as part of Colorado's special education regulations. Unlike other states,

Colorado does not contain an "Other Health Impaired" category of the disability as defined in the federal law. In 1992, Colorado chose to fill this category and include ADHD under Special Education and classify it as a physical disability if it prevents a child from receiving reasonable educational benefit from regular education (Adams, 1994).

In addition to the physical disability category, students may qualify for special education if they have a significant "Identifiable Emotional Disability". In this category, in order to cover ADHD, the words "to pay attention" were added to the phrase "significantly limited self control". ADHD students can now be covered under this category because the definition now reads, "Significantly limited self control, which includes an impaired ability to pay attention". Also, students may be covered under the category "Perceptual or Communicative Disability" in which ADHD is referred to as "a basic disorder in the psychological processes affecting language and or learning that may manifest itself in an impaired ability to listen, think, attend, speak, read, write, spell or do mathematical calculations" (Adams, 1994, p 37). To fulfill the standards set by Section 504 and IDEA for ADHD, students with this designation are put into a "protected class" status. One of the challenges of putting students into this status is that it must be accomplished in an objective manner lest the student carry a negative stigma of being labeled and have long term implications for future life choices.

Criteria for Eligibility in Colorado

In order to be eligible for special services, two circumstances of condition and impact must co-exist. There must be a *condition* within the child that is at least partly responsible for his /her difficulty with learning. This condition must have an *impact* on the child's education. According to state regulations, for a child to be classified ADHD, he

must fit the criteria established by the Diagnostic and Statistical Manual of the American Psychiatric Association. For him to be qualified as ADHD, he must fit many of these criteria before the age of seven, continue this behavior for at least 6 months, and in two different situations including home and school (Adams, 1994).

According to the guidelines issued by the American Psychiatric Association, the dysfunction must be significant and continuous over a long period of time. In addition, ADHD is broken down into three different criteria, which label the person either predominantly inattentive, hyperactive-impulsive, or a combination of both dysfunctions. In any of the three cases, the overall label is now established to be Attention Deficit Hyperactive Disorder and the child will exhibit one or more of the following behaviors (Nathanson, 1992; Quinn, 1994; & Wiles, 1996):

- short attention span,
- acting before thinking,
- easily distracted,
- frequency in motion,
- inconsistency in learning,
- difficulty generalizing new information,
- inability to remember,
- often disorganized,
- language delays,
- lack of self esteem, and/or
- difficulties with social relationships with adults, siblings and peers.

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