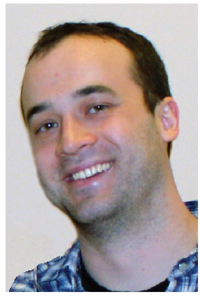
A Search for Excellence in Gifted Children with Reflex Integration

Svetlana Masgutova, Ph.D, Orlando, FL, USA, Denis Masgutov, Poland, MNRI® Program Creators

Introduction to MNRI® for Gifted Children

Svetlana Masgutova, Ph.D Denis Masgutov

The Masgutova Neurosensorimotor Reflex Integration (MNRI®) program presents a whole-personality approach which is based on the knowledge and experience of neurodevelopment through the use of reflexes. Reflexes are our genetic motor patterns (Pavlov, 1927/1960; Sechenov, 1863/1995; Sherrington, 1947), which optimize the development of our physical and cognitive spheres and the regulation of our behavior and emotions (Masgutova, 2011).

The MNRI® program has been applied to gifted children for two important reasons: this program is aimed at the support of natural genetic sensory-motor memory and motor-cognitive processes and, although gifted children display unique abilities and talents in specific areas, they often also have challenges in areas of sensory-motor integration, motor-physical development, emotional stability and maturation, as well as, personality growth and communication (Masgutova, Ozerova, 1995).

Key words: Masgutova Neurosensorimotor Reflex Integration (MNRI®) program, gifted and talented, Reflex Profile.

Goals

The results of the MNRI® Reflex Parameter Assessment were completed for 270 gifted children. The results from this study were compiled to:

1) evaluate the levels of reflex pattern maturation and function in gifted children and create their Reflex Profile

2) study the effect of the MNRI® reflex integration therapy program on the neurodevelopment of these children based on restoration of their primary reflex patterns.

Definition

Reflexes are automatic responses of the nerve system to a specific stimulus of certain modality (tactile, visual, auditory, vestibular, proprioceptive, olfactory) expressed through specific posture or motor (or glands secretion or pupillary) responses (Sechenov, 1863/1995; Pavlov, 1927/1960) that activate neurodevelopment and also trigger protective mechanisms simultaneously (Masgutova, 2011).

Reflexes, the first and earliest genetically determined motor-behavioral patterns, must be integrated into higher controlled sensory-motor abilities and skills to provide for processing or decoding of the input, programming and control of motor and behavioral actions, memory, learning, language and communication (S. Masgutova, 2011). Thus matured reflex patterns create the neurophysiological foundation of development and learning, while poor development of the patterns leads to a lack of sensory-motor integration, reactive movements and responses, impulsive behavior, lack of postural control, and poor motor programming and coordination that can negatively affect motivation and achievement.

Based on the National Association for Gifted Children's definition for giftedness, a child must demonstrate "outstanding levels of aptitude or an exceptional ability to reason and learn, and/or competence (documented performance or achievement in the top 10% or better) in one or more domains: mathematics, music, language, and/or a set of sensorimotor skills – painting, dance, or sports" (www.nagc.org, 2010). There is no typical definition of giftedness that is accepted universally. Often this term is used associated with terms such as: 'intelligent', 'talented', 'genius', and 'creative' (Chambliss, 2010; Fulkerson, Horvich, 1998; Eide and Eide, 2004; Silverman, 2002). The term 'giftedness' still differs from these terms though it includes some features of each. It has multiple meanings and specific nuances depending on the area of creativity/intelligence, and the typical and individual features of the child with exceptional abilities (Gagné, 1985; Renzulli, 1978; Fulkerson, Horvich, 1998; Silverman, 2011). Overall accepted definitions in psychology are as follows:

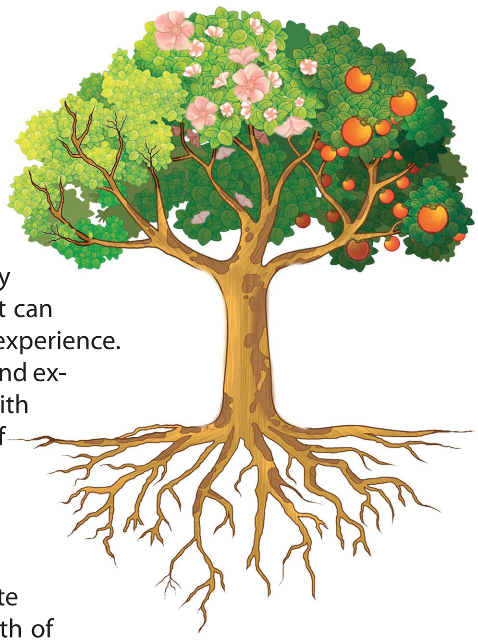
• Giftedness is determined as an innate predisposition for productive exploration and successful learning of some human ability/skill. Note, that to be gifted does not mean being able to do the relevant activity successfully. Giftedness means that a person can easily master specific types of activity/skills and achieve considerable success in it based on this predisposition.

• Talent is displayed when a person possesses advanced skills and not just innate predisposition. A talented person is an individual who has demonstrated or has performed in real action/life an outstanding ability to perform with considerable success with a specific type of activity/work. The results of such performance are at a higher level and exceed the average performance of the work done by many other people.

• Genius typically refers to a level of performance or achievement in an activity or work when a person is not only talented, but has already achieved outstanding or phenomenally recognized success in one specific or several areas of activity in life.

Giftedness can be typical for more children and adults (potentially almost every person can have some giftedness as well as people with high levels of abilities). However, fewer individuals demonstrate extraordinary talents. Rare individuals will demonstrate genius abilities (Chambliss, 2010; Gagné, 1985; Renzulli, 1978; Fulkerson, Horvich, 1998; Eide and Eide, 2004; Silverman, 2002).

Exceptional Abilities and Developmental Challenges in Gifted Children



So giftedness as the basis for development of extraordinary skills can be seen in children as "exceptional performance on tests and/or other measures of ability or as a rapid rate of learning, compared to other students of the same age, or in actual achievement in a domain" (www.nagc.org, 2010; Gagné, 1985; Renzulli, 1978). As a child matures to adolescence, high levels of *achievement and motivation* in the domain become the primary characteristic of their giftedness. The formation of ability or talent can take a life span and depends on a deeper level of exploration and experience.

Various factors can either enhance or inhibit the development and expression of the abilities of gifted children. Some gifted children with exceptional aptitudes may not demonstrate outstanding levels of achievement due to different circumstances. (Gagné, 1985; Renzulli, 1978). Among these are: environmental/educational (family and school), social and personality (limited opportunities to learn as a result of cultural barriers, social demands and beliefs, family expectations, personality growth, motivation), health (physical state and possible learning disabilities), genetic predispositions (strength of the nerve system and resilience, diseases, etc.), and also neurophysiological (nerve system functions, brain integrative and plasticity mechanisms, myelination of the reflex circuits), (Chambliss, 2010; Gagné, 1985; Renzulli, 1978; Fulkerson, Horvich, 1998; Eide and Eide, 2004; Silverman, 2011), and neurodevelopmental including overall maturity of automaticity, sensory motor integration and integrity of reflex patterns (Masgutova, Ozerova, 1995).

Gifted children may develop asynchronously when their intelligence formation is ahead of their physical growth and sensory-motor integration, thus their social-emotional and cognitive abilities may often develop unevenly (Chambliss, 2010; Gagné, 1985; Renzulli, 1978; Fulkerson, Horvich, 1998; Eide and Eide, 2004; Silverman, 2011; Nikitin, Nikitina, 2004; Masgutova, Ozerova, 1995). This asynchronicity and dichotomy between potential for and demonstrated achievement should be the focus of early intervention. Focusing on integrated neurodevelopment can be one of best solutions added into the design of school programs and services for gifted students.

The MNRI® program offers a unique possibility to support the natural resources for this group of children and adults using reflex patterns as the earliest and most fundamental brain integrative patterns (Masgutova, 2011). The program serves to accomplish the missing link in neurodevelopment for this group of children. It involves:

• the MNRI® Reflex Parameter Assessment tool for determining the level of reflex development
• knowledge of the Reflex Profile of Gifted Children based on research of their level of reflex development
• a MNRI® Reflex Integration Procedure to support neurosensorimotor coordination.

The children who participated in this study were determined or described by school psychologists as *gifted children*, whose main descriptions were equal to those described above. Here we present typical, very general tendencies of the gifted children's neurodevelopment, not differentiating between the differences that we can observe in a wider spectrum of their traits or focusing on their developmental challenges.

Typical challenging features of gifted children described by various authors (Chambliss, 2010; Gagné, 1985; Renzulli, 1978; Nikitin, Nikitina, 2004;) in combination with immature reflex patterns are (Masgutova, 2011; Masgutova, Ozerova, 1995):

• sensory hyper-sensitivity (tactile, auditory, tactile) and, at the same time, ignoring some important stimuli
• poor muscle tone regulation (hyper- or hypo-tension)
• delay in physical development as a result of ignoring movement-driven activities
• poor motor coordination, chaotic movements, and reactivity in actions and behavior (especially in situations of stress
• poor postural control and equilibrium
• gaps in the development of kinesthetic-motor memory
• lack of ability to imitate and follow motor instructions
• difficulties with communication and socialization as a result of avoiding interaction with others, lack of interpersonal boundaries, ignoring the importance of communication, and 'absence' during conversation (being preoccupied with new ideas or images)
• negative or critical viewpoints of others' thinking, logic, and creativity (considering this as uninteresting, incompetent, and boring)
• impatience and poor ability to wait for others' turn and irritation at their slow speed
• poorly developed self-defense reactions
• over-focus and too much specialization on their specific topics of interest or curiosity
• tendency to focus on negative emotional experiences
• emotional sensitivity and overwhelm (crying and becoming easily frustrated)
• fears and phobias
• poor adaptive habits

Some Aspects of Developmental Challenges

Below are some typical challenges of gifted children in physical and neuro-development based on our long-term clinical observations when working within the MNRI® intervention (Masgutova, 2011).

Challenges in muscle tone regulation. Difficulties with coordination of motor programming, planning, and control causing a delay in motor-postural control development. This also is pre-determined by a lack of proper muscle tone regulation, and, particularly, muscular hypotonia of one group of muscles and hypertonia of another group of muscles in infancy and early childhood. This is due to an imbalance of the excitation and inhibition processes in the reflex circuits. Typically, a lack of coordinated muscle tone in gifted children is presented by:

• hypertonic muscles in the dorsal part of the body (along the spinal column – thoracic longus, trapezius) together with hypotonic latissimus dorsi, abdominal muscles, and diaphragm affecting postural control and a need to release tension by constant and impulsive movements, challenging the equilibrium mechanisms

• hypertonic upper limb muscles (bracioradialis, biceps) together with the hypotonic extensors (servical longus, levator scapular, scalene, upper trapezius) in the back of neck and arms, and also a lack of proper muscle tone in the forearms, which causes a tendency to keep elbows flexed

• overworking lower limb muscles (soleus, gastrocnemius, Achilles tendon, quadriceps mm., hamstring) resulting in tight muscles and, for some children, a tendency to walk on the toes

• poorly toned muscles of the oral-facial area (buccinators, masseter, major zygoma mm.) and very tight muscles around the jaw joint (lateral and medial external and internal pterygoid mm.) causing difficulty with jaw relaxation, chewing, and swallowing.

Another reason for the imbalance in muscle tone is shallow and rapid breathing with a tendency for hyperventilation, especially in moments of stress.

Improper muscle tone regulation can cause serious imbalances in postural control. Our clinical observations demonstrate that gifted children may also have an undeveloped body structure and lack of flexibility for rotational movements, postural control, and overall mobility due to muscle tone regulation issues.

The disharmony of the muscle system can indirectly result in a tendency to escape from external stimuli, over focusing, and withdrawing into one's 'own world'. That is why a child may find himself in the vicious circle of an asynchronous delay in the development of their physical, motivational, and emotional spheres. This muscular disharmony leads to improper impulsive reactions which may with age turn into permanent disharmony and cause specific challenges in their behavior, resulting in a lack of goal orientation, poor inner control, hyperactivity, being chaotic, an inability to focus on and follow instructions, conflicting behavior, irritability, impatience, impulsiveness, ignoring stimuli, and other issues. Therefore, a correction of muscle tone is necessary.

Challenges with postural control. Many gifted children demonstrate the following body posture characteristics: leaning too far forward, in dissonance with too tight spinal muscles, poor neck and abdominal muscles, and tight calf muscles. This often is linked to an immature vestibular system and visual over-convergence. The child is challenged to keep a natural balance with all senses integrated. Their gravity center, which is shifted disproportionately to the front and the muscles are tight in area of their spine and lower limbs, activates the over-defensive response of fight or flight. This leads to an increase of impulsive movements. It is important to organize activities with an emphasis on sensory-motor and muscular-motor coordination and control and development of kinesthetic consciousness. Impulsiveness and over-defensive responses can cause emotional sensitivity and instability in a child. The more the body is inclined forward, the more tightened are the muscles of the back, causing breathing to be inhibited and hyperactive.

Challenges with motor coordination. Gifted children can be more inclined toward poor stability while standing and walking with uncoordinated movements that are delayed or reactive when compared to the development of neurotypical children.

Chronologically, gifted children often do not reach the same motor development milestones as their neurotypical peers. This development may either be delayed or exhibit early development which can undermine the correct develop of skills. Parents of gifted children report that the head righting pattern forms in their child at 3-4 months of development (a delay of 1-2 months, while it typically takes place at 1½-2 months), rolling over at 7-10 months (delay of 2-6 months, while it normally takes place at 4 months), delayed in skipping (at 2½-4 years), jumping (4-6 years), starting with one-two years of delay. In contrast, some other motor milestones may be achieved earlier than for neurotypical children, like an ability to stand up can take place at 6 months (typically it occurs at 8-11 months); many of these children skip crawling and start walking at 7 months (occurring typically at 10-14 months); and some start sitting at 4 months (occurring typically at 6 months).

The coordination of movements within the sagittal plane (right-left axis plane), horizontal plane (rotational, lateral extension-flexion), and dorsal plane (flexion-extension, postural control) is not harmonious which limits movements that happen in a 3-dimensional plane. Many gifted children have comparatively better developed righting movements and delayed rotational movements resulting in poor postural control and motor coordination. The result of all this for many children in this group is the same – hyperactivity, fast walking with over-activation of the balancing patterns, running around or the opposite when muscles are too tense (they often refuse exercise), that form certain features and habits in behavior such as over-excitation or freezing.

A dissonance in their excitation-inhibition processes and chaotic motor or freeze responses should be the target of therapy by parents and professionals. Specially oriented sports activities and regular gymnastics, are important. These sports can include active walking, running, skiing, swimming, weight training, soccer, and other types of exercises. This is a good opportunity to also work on communication skills and abilities, for coordinating movements with other participants to learn skills such as estimating distance, direction, and amount of applied strength in playing a game (such as playing with a ball).

Fine motor coordination is better developed in gifted children than gross motor coordination. Still, the tone regulation in muscles that supply gross motor coordination can influence the development and ease of fine motor coordination supporting manual dexterity, visual and auditory perception, and integration of these systems.

Oral-motor (fine motor) coordination and the formation of speech is also better developed in gifted children than cross motor coordination. This allows them to advance quickly with their abilities in language and abstract thinking. The MNRI® program based on analysis of clinical observations proposes certain strategies and procedures to target maturation of the gross and fine motor systems and any milestones that were skipped by a child.

Challenges in visual and auditory systems. Gifted children tend to have restless or hyperactive eye movements as a result of their advanced capability to explore many visual objects simultaneously, and also over focusing on details that they are interested in. However, this results in immobilization of their eye movements, and dilation of the pupils leading to eye freezing effect. Thus, gifted children can have a narrower, limited visual span and visual over-focusing (for screens, i-Pads, i-Phones, and computers) with hypoactive peripheral vision. This will often cause an impaired ability for protective visual responses (poor estimation of 'danger in the area', bumping into furniture and other people, or poor estimation of distance, especially in times of stress), and poor vestibular balance. For some specific visual or auditory objects, they can be over focused and sitting for too long watching something of interest, until their brain becomes exhausted, over stimulating their static balance (vestibular system). Many of these children demonstrate an obsessive interest in computers (with traits of addiction). Their pupillary reflex can be over reactive showing hypersensitivity (too much excitation of the sympathetic system). In such cases, impulsive traits can follow, activating territorial behavior (caused by visual reactivity). In some cases, it can be the opposite, exhaustion can lead to hypoactive work of the vision system.

The auditory system and its processing mechanisms are usually well developed in gifted children, still their protective reflexes (stapedius, ATNR and Auditory Fear Paralysis) can be too sensitive causing overall auditory sensitivity. They have rather well developed sound orientation and monaural and binaural perception. However, their auditory system can be overloaded by difficulty in sound prioritizing (a tendency to hear several sounds/texts simultaneously) and their 'inner dialog' is overloaded. Over-activation of the auditory system can cause reactive behavior and results in attempts to protect their own auditory system (ignoring stimuli, escaping conversations, closing ears). Their exceptional ability for productive processing (decoding/coding, sound differentiation, sound source orientation, and auditory analysis) and unique aptitude for language and speech can work together with hypersensitivity to sounds and cause them to become easily irritated, noted in their behavior and communication.

Challenges in reflex patterns development. Some reflexes in gifted children are immature. In each case, this immaturity or lack of integration is very individual. Usually these children skip development of some unconditioned reflexes (from 0 to 4 months of life). Below is the individual description of reflex development based on over 25 years of clinic observation of unconditioned reflex patterns in over 270 gifted children:

• Tonic Labyrinthine Reflex can be delayed by several months and mature to 6-12 months of life (in norm – the unconditioned pattern develops between 4-5 months of life; Barashniev, 2001; *Child Neurology,* 2000; Florintino, 1973; Masgutova, 2011). The delay of their Tonic Reflex patterns inhibits formation of their static (postural) and dynamic reflexes (i.e., STNR, Head Righting).

• Head Righting Reflex starts developing after 2-4 months of age or later (in norm – the unconditioned pattern matures between 1½-2 months of life; Barashniev, 2001; Florintino, 1973; Masgutova, 2011). A delay in this pattern results in a delay of 'head-core-trunk' coordination, STNR, and Trunk Extension. Later, Trunk Extension becomes hyperactive in many gifted children (leading to hyperactive muscles and tension in their body).

• Hands Grasp Reflex starts developing timely (after birth) and matures earlier, up to 3 months (in norm – this reflex develops up to the end of the 4th month of life; life; Barashniev, 2001; *Child Neurology*, 2000; Florintino, 1973; Masgutova, 2011). There are also many gifted children that are delayed with the unconditioned pattern and, later, just skip the development of the earlier phases (phase 2 and 3) and develop phase 4 (the 'hanging grasp' with fingers more actively closed and palms more open). This delay causes poor ability for proper protection (when falling down) in contrast to the conditioned patterns (using a pincer and tripod grip) that support hand manipulation skills (eating, using silverware, and handwriting) which happen to develop faster than in other children.

• Trunk Extension Reflex develops closer to the end of the 6-7th month (in norm – infants start demonstrating this response in the 1st month and it must be matured by the end of the 7-9th months of life; Barashniev, 2001; *Child Neurology,* 2000; Florintino, 1973; Masgutova, 2011). So gifted children are advanced in the development of this pattern compared to peers with neurotypical development, though they demonstrate hyperactive responses because of hyper muscle tone and too active functioning of the excitatory processes of the nerve system. The tendency for hyperactive Trunk Extension also inhibits the development of crawling abilities.

• Crawling Reflex develops in norm from prenatal time (12 weeks of gestation) and integrates up to 4th months of life (Campbell, 2004; Barashniev, 2001; *Child Neurology,* 2000; Masgutova, 2011). Many gifted children do not crawl in infancy and therefore didn't develop this pattern, preferring to start walking earlier than their neurotypical peers. Thus, these children are not well coordinated for reciprocal (cross-lateral) gross motor coordination, motor programming, planning and control, and motor multitasking. Reflex Assessments reveal that many of these children develop their corresponding skills through conscious learning based on activity in the higher brain (instead of matured automaticity). Unfortunately, development achieved by 'skipping' phases is most affected by stress. Therefore, motor coordination is more affected in these children during times of stress on the neurological system.

• Automatic Gait Reflex develops early in gifted children and is often hyperactive (in norm – infants start demonstrating this response in the 1st month and it must be matured by 2 months of their life; Barashniev, 2001; *Child Neurology,* 2000; Florintino, 1973; Masgutova, 2011). However, in children with muscle hypotonia, it is more often hypoactive (with a tendency for freezing and lack of interest for active gross movements). This pattern is linked with visual over focusing on one side, it supports the development of inner direction and orientation on goals; on the other, it leads to over focusing.

• Hands Pulling Reflex can be delayed and forms between 4-5 months of life or later (in norm, development occurs up to end of 2nd month of life; Barashniev, 2001; Florintino, 1973; Masgutova, 2011). The sequence of flexion ('elbows-head-core') is essential for the biomechanics of this reflex. When the sequence is incorrect, it negatively affects the 'core flexion-visual convergence' and 'trunk extension-visual divergence' coordination. Thus, vision and Hands Supporting support each other or, they support each other less than is required, resulting in stronger abilities to form 2-dimentional visual images than 3-D. It should be noted, however, that 3-D vision appears to develop later, thanks to their giftedness.

• Hands Supporting Reflex in children of this group is typically not developed (in norm – infants start demonstrating this response in the 4 months and it must be matured by 6 months of their life; Barashniev, 2001; Child Neurology, 2000; Florintino, 1973; Masgutova, 2011). We don't see development of this specific reflex without specially oriented training. Thus, gifted children often have limited means of protection on a biochemical level (in case of falling down and using their hands for support when needed).

• Asymmetric Tonic Neck Reflex (ATNR), within its unconditioned pattern (integrating normally at 6-7 months; Barashniev, 2001; Child Neurology, 2000; Florintino, 1973; Masgutova, 2011), usually develops timely in gifted children but tends to be hypersensitive and hyperactive. This causes too much parallel processing of sounds resulting in increased tension in the auditory system. The tension results often in a tendency to ignore some important stimuli. The delay of this reflex causes poor spatial sound orientation, challenges in transitioning from monaural to binaural auditory perception, struggling to process information (led more through conscious control), missing some specific sounds, and irritation and impatience in their communication.

• Moro and Fear Paralysis (FPR) Reflex patterns serve for protection against sensory stressors (FPR) and proprioceptive stressors (Moro) (in norm – infants demonstrate this response at 2-4 months of life and it must mature to the 4 months and the FPR integrates to 2 years of life; Vygotsky, 1934/1986; Barashniev, 2001; Florintino, 1973; Masgutova, 2011). These two reflexes are often confused in many gifted children thus leading to a lack of differentiated function in the sympathetic (excitation) and parasympathetic (inhibition) nervous systems causing hyperactivity (Moro) or 'freezing' affect (FPR, an 'absent state' or indifference). Also, fear and panic, with a tendency for irritation or anger is sometimes observed. Some of these children have phobias from being too sensitive to stimuli that have caused negative emotional responses in their life (such as fear of animals or birds, fear of natural phenomena such as the night, earthquakes, wind, diseases, microbes/viruses, or death). Because of their over focusing, they can take fear to a deeper inner place, making it challenging to lessen their fear anchors.

• Segmental Rolling (in norm integrates at the 3-4 months of life; Barashniev, 2001; Sadowska, Zaleski, 2008; Masgutova, 2011) and Spinning Reflex pattern (in norm integrates at the 4 months of life; Barashniev, 2001; Sadowska, Zaleski, Florintino, 1973; 2008; Masgutova, 2011) are delayed, expressed poorly, and are rigid (the child activates the axis body plane for movements and posture much more for activation of movement in the horizontal plane). This causes a lack of rotational movements and inflexibility resulting in too much running, and, in some children, walking on their toes and jumping while walking.

• Vestibular-Ocular Reflexes (horizontal and vertical; in norm integrate at the 2 and 6 months of life; Masgutova, 2008; Florintino, 1973; O'Reilly, Morlet, Cushing, 2013) support stability of moving visual images and are less developed in many gifted children leading to a lack of equilibrium causing rigidity, hyper- or hypo-active physiological nystagmus, poor vestibular-visual coordination, ocular-proprioceptive disorientation, too much convergence activity, and a lack of peripheral vision development. Both focused and peripheral vision usually develop later, thanks to their fast learning. However, as with other reflexes developed after 'skipping early phases' of development, the vestibular-ocular reflexes in gifted children are often less resilient during times of stress.

• Convergence/Divergence Reflex responses (bringing eyeballs close together to see close objects and apart for distant objects; in norm integrate at 1½ – 2 months of life; Florintino, 1973; Masgutova, 2008; O'Reilly, Morlet, Cushing, 2013) basically develop in gifted children at the typical time which helps their cognition of the objects of the world (focusing, decoding, analysis). Their highly advanced intelligence makes their visual work significantly richer and unique. Nevertheless, the work of divergence is not balanced and causes some delay of their peripheral vision. This can trigger protective responses in the brain and a chaotic gaze, lack of smooth eye movements, and more voluntary control for eye mobility, visual analysis, and comprehension (on a conscious level) than automaticity.

Acoustic Stapedial Reflex and sound prioritization. The Acoustic Stapedial Reflex (triggering the eardrum with a sharp, high frequency sound, causing contraction in the stapedius muscle of the middle ear; in norm integrate at the 2-4 months of life; Masgutova, 2008; O'Reilly, Morlet, Cushing, 2013) in gifted children is often hyperactive. The reflex is developed in a timely manner and helps to differentiate phonemes and other sounds precisely. Thus, early articulation and speech development occurs, but the auditory system is hypersensitive. Gifted children also have a tendency for over-focusing, which inhibits their ability to prioritize sounds as to what is important or not important) overloading their processing. This leads to protective behaviors of ignoring or inhibiting the auditory stimuli (confusion with Abdominal Sleep Posture Reflex). They can easily lose their interest in working longer. The result of this is over-focusing, incomplete auditory processing, becoming tired, and jumping to the next stimuli or topic which makes them appear to be hyperactive.

• *Breathing Reflex patterns* (in norm integrate at the 2-6 months of life; Masgutova, Masgutov, Akhmatova, 2012) can be hypo- or hyperactive in gifted children causing challenges in motor development. Their diaphragm can be too tight or hypotonic resulting in hyperventilation and shallow inhaling, causing disharmony in their breathing cycle. This is especially true when they are trying hard or under stress (physical, emotional, or cognitive).

The above brief descriptions of some of the basic reflex patterns show that there is a need for effective, practical options for addressing the neurodevelopmental challenges of gifted children. MNRI® allows us to treat these problems using the reflex re-patterning concept of a reflex is a unit of the nerve system given genetically. Therefore, working with it guarantees activation of the sensory-motor genetic memory creating profound results in the integration of the sensory, motor, and muscular systems.

MNRI® is a novel and non-invasive method of support for neurodevelopment and functions of the central nervous system, including neurodeficits. More than 30,000 children have benefited from this program over the last 20 years. MNRI® initially evaluates children's reflex patterns using the MNRI® Parameter Assessments of 30 reflexes (see the Assessment article in this book). This is followed by an individualized program for correction (repatterning) and integration of reflex patterns into the child's central nervous system function through sensory motor circuits. Repatterning dysfunctional reflex patterns results in improved gross and fine motor coordination and skills, as well as postural control (Bernstein, 1997). This leads to improved behavior because children learn to regulate involuntary unconscious spontaneous motor activity and emotional responses (Bobath, Bobath, 1984; Masgutova, Akhmatova, 2007). Improved cognition also occurs (Piaget, 1936/1976; Montessori, 1949/1995).

Results and Conclusions

This article provides the results of the MNRI® Assessment and repatterning interventions for 270 gifted children aged from 5 to 19. The children were participants of the following MNRI® programs: Neuro-Structural Reflex Integration, Tactile Integration, Dynamic and Postural Reflex Pattern Integration, Lifelong Reflex Integration, Proprioceptive and Cognitive Integration, Visual and Auditory Reflexes Integration, Oral-Facial Reflex Integration, Art Creation and Reflex Integration, and Archetype Movement Integration. These programs were facilitated by a group of professionals trained in the MNRI® program during organized therapeutic conferences, and individual therapy with children with developmental deficits. Statistical analysis was carried out before and after 8 days of MNRI® programs at the neurosensorimotor rehabilitation camps/conferences organized by the International Dr. Svetlana Masgutova Institute.

An evaluation was conducted for patients of their 30 reflex patterns which were divided into three groups coordinating with the following body movement planes: sagittal, horizontal, and dorsal (Krefft, 2007). Every reflex pattern was evaluated on a scale of 0–20 with regard to five parameters: reflex pattern, direction of movement, strength of reaction, timing of reaction, and symmetry (Masgutova, 2011). The testing within these parameters was done for each reflex pattern individually. A rating of 10 on the scale determines the reflex to be at the transition state in

Table 1. *Reflex #*	*Reflex pattern*	*Gifted Children (270 individuals; age 5-19)*		*Neurotypical Control Group (780 individuals; age 2-19)*
		Before MNRI®	*After MNRI®*	
1	Core Tendon Guard	14.54	15.56	15.5
2	Robinson Grasp	16	17	17
3	Hands Pulling	15.5	16.76	16
4	Babkin Palmomental	15.5	16.34	16
5	Babinski	14.5	15.72	16.5
6	Leg Cross Flexion	16.5	17.5	17
7	Asymmetrical Tonic Neck	15.87	17.86	15
8	Abdominal	14.5	15.76	16
9	Bonding	15	16.5	15.5
10	Foot Grasp	15.5	16.86	16.5
11	Thomas Automatic Gait	14.5	16.5	17.5
12	Bauer Crawling	14.5	16.76	15.5
13	Moro Embrace	14.54	16.65	15.5
14	Fear Paralysis	14.65	15.24	14.5
15	Hand Supporting	14.5	16.5	15.5
16	Segmental Rolling	14.52	16.54	15
17	Landau	14.34	15.52	15
18	Flying and Landing	14.64	16.5	14.5
19	Grounding	14.25	16.5	16
20	Head Righting	16.56	17.34	16
21	Trunk Extension	15.76	17	17.5
22	Symmetrical Tonic Neck	16.62	17.56	15.5
23	Spinal Galant	14.74	16	15.5
24	Spinal Perez	14.37	15.65	14.5
25	Tonic Labyrinthine	15.02	15.74	15.5
26	Foot Tendon Guard	14.45	16.25	15
27	Spinning	15.52	16.36	15
28	Locomotion	14.25	16.78	14.5
29	Balancing	15	16.5	16
30	Pavlov Orientation	17.5	18.75	16

Table 1. Changes in the average level of development of reflex patterns for 270 gifted children before and after completing treatment at MNRI® camps.

development of the pattern between its pathological/dysfunctional and normal state, whereas numbers from 15–20 represent normal functioning (Krefft, 2007). The *Assessments* article in this book shows the points scale determining the criteria of evaluation of pathology, dysfunction, norm, and integrated levels of reflexes and their patterns, and the levels of integration of the basic pattern and its variants with intentional and controlled movements (Masgutova, 2011).

The MNRI® Assessment of 270 gifted children shows that some typical reflex patterns are immature at the age when they should have accomplished their development. At the same time this differs from child to child. The knowledge of Reflex Profiles of gifted children and individual differences in patterns can help to create an individualized MNRI® program for gifted children directed at facilitating improvements on sensory motor dissonance, neuro-facilitation of reflex circuits, and all parameters and integration of tactile, visual, auditory, vestibular, proprioceptive protective and breathing systems. A priority focus of the MNRI® program for gifted children is to support their neurodevelopment, as well as emotional, social, and cognitive functions through reflex integration and neuroplasticity (Syka, Merzenich, 2003; Sadowska, Zaleski, 2008).

Reflex Assessment of gifted children demonstrates that many of their reflex patterns have not accomplished their maturation though these children have grown seemingly well, thanks to their giftedness, intelligence, and language skills (developing earlier than their peers). Still, their physical abilities are delayed, to some extent, and this can be seen in their hyperactive protective mechanisms and lack of flexibility in stress and distress (as also was reported by their parents). The delay in development of

Figure 1-A. Saggital Plane of the Body

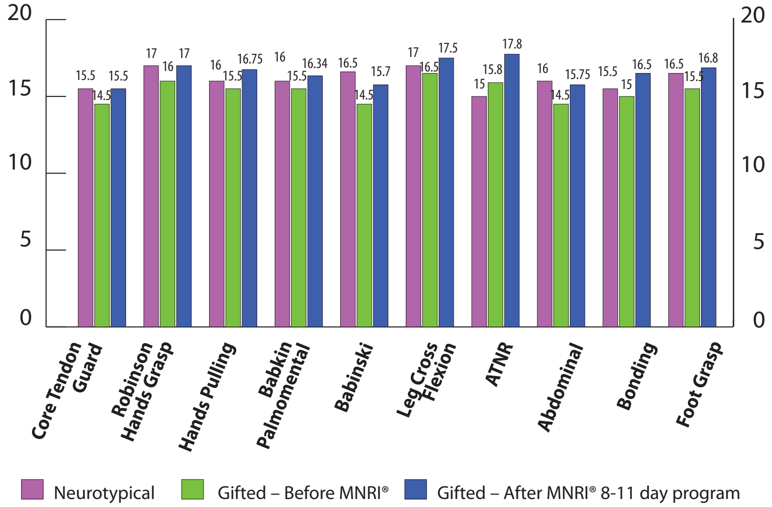


Figure 1-B. Horizontal Plane of the Body

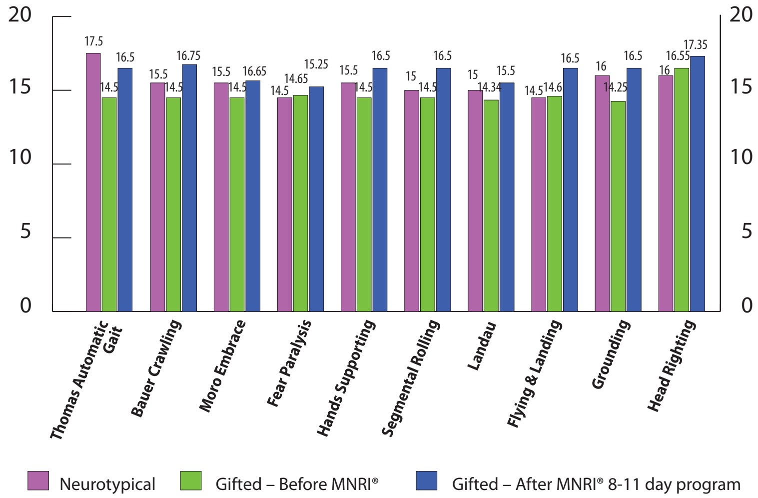
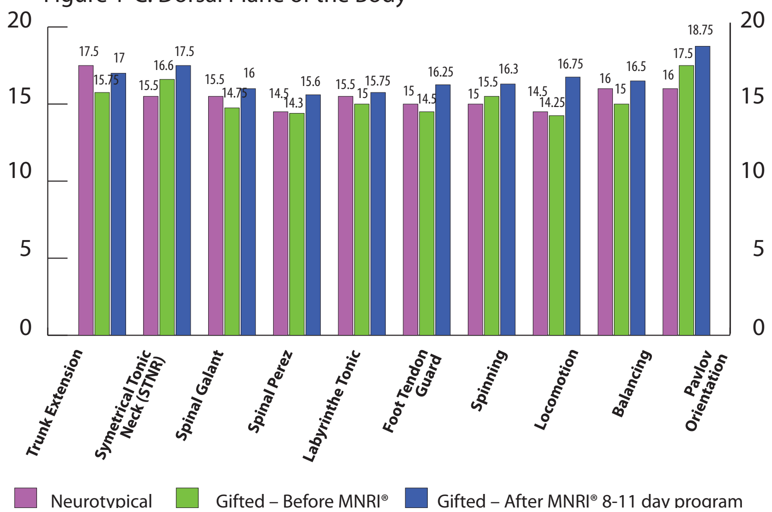


Figure 1-C. Dorsal Plane of the Body



unconditioned phases for some reflex patterns can be one of the early signs for a predisposition for asynchronisity. This is why reflex integration therapy must be an early intervention tool for every child in the world as it utilizes natural, friendly exercises to activate reflex patterns and help them to mature using the potential within the child.

The MNRI® Assessments of reflex patterns in 270 gifted children were performed to learn the overall tendencies and specific features in their reflex profiles. The results of the Assessments were compared with reflex patterns of a neurotypical group of children serving as a control group. Reflex patterns also have been compared in the same group of gifted children before and after an 8-day MNRI® Conference (see Table 1, Figures 1 - A, B, C, and Figure 2) to learn the effectiveness of MNRI® on gifted children.

The results in Table 1 show:

1) the differences in the levels of development of reflex patterns in gifted children in comparison to those children with neurotypical development and how the gifted children show some lack of maturation of reflex patterns.

2) the level of development of reflex patterns in gifted children improved (after MNRI® treatment) which can lead to positive changes in their physical and overall development, and as management of stress and survival.

The results of changes in the level of reflex pattern integration of the 270 gifted children after completing treatment at an 8-day MNRI® Conference/Camp (compare pre- and post assessment data) demonstrates a positive change in all reflexes after the MNRI® intervention. The results of statistical analysis were validated by synthesized function z = f(x) (by NewKrefft algorithm, A. Krefft, 2007) and also by nonparametric comparison of two variables by Wilcoxon Matched Pairs test ($P<0.001$; Statistica Program), which proves the high degree of effectiveness of the MNRI® program as applied to gifted children during 8 days/6 hour daily intervention.

An analysis of the levels of development and integration of 30 reflex patterns within three groups corresponding to body-motor planes A, B, C (A – sagittal, B – horizontal, C – dorsal) before and after the MNRI® program are shown on Figures (see Figure 1 – A, B, C).

Assessment results data shows several important details:

Figure 1-A. Reflex group 1: Sagittal Plane of the Body

Figure 1-B. Reflex group 2: Horizontal Plane of the Body

Figure 1-C. Reflex group 3: Dorsal Plane of the Body

Gifted children performed reflex patterns (see Table 1 above) on the following level of development:

• 20 reflex patterns were assessed to be lower than normal maturation (66.67%; Core Tendon Guard, Babinski, Abdominal Sleep Posture, Bonding, Thomas Automatic Gait, Bauer Crawling, Moro, Fear Paralysis, Hands Supporting, Segmental Rolling, Landau, Flying and Landing, Grounding, Symmetrical Tonic Neck, Spinal Galant, Spinal Perez, Foot Tendon Guard, Balancing, Tonic Labyrinthine, Locomotion)

• 6 reflex patterns were assessed to be close to normal maturation (20%; Hands Pulling, Babkin Palmomental, Asymmetrical Tonic Neck, Foot Grasp, Trunk Extension, Spinning)

• 3 reflex patterns were assessed to be at the norm/matured level (10%; Robinson Grasp, Leg Cross Flexion-Extension, Head Righting)

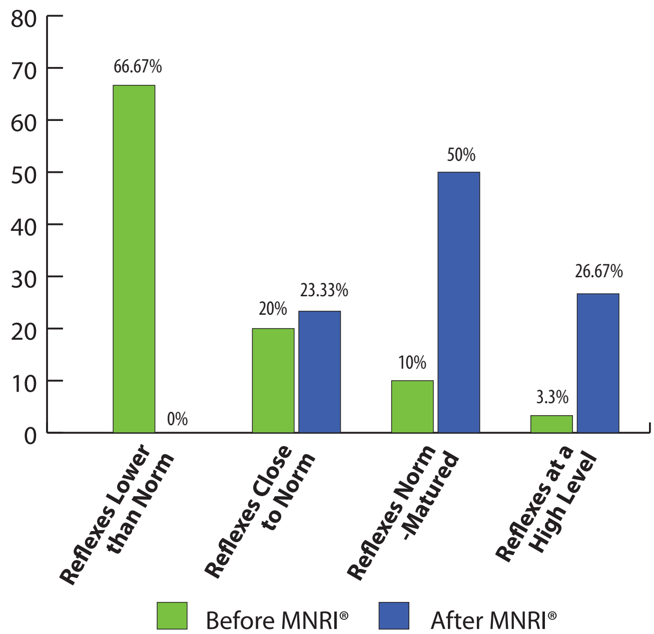
• 1 reflex pattern was assessed to have a high level of integration (3.3%; Pavlov Orientation).

These results show that:

1) all reflex patterns are on functional level

2) 13.3% of reflex patterns are on a mature/

Figure 2. Gifted Children: Reflexes before and after MNRI®



integrated level

3) 20% of reflex patterns are close to matured

4) 66.67% are still not matured, though they are functional (Figure 1, 2, 3).

5) reflex profiles in gifted children show the need of the support for neurointegration of reflex patterns

6) immature reflex patterns cause, to some extent, asynchronicity in the neurodevelopment of gifted children.

After the MNRI® program, the level of development of reflex patterns improved significantly, and specifically for the following reflex patterns (see Figure 2):

• 0 reflex patterns were assessed to be lower than norm maturation (0%)

• 7 reflex patterns were assessed to be close to norm (23.33%; Core Tendon Guard, Babinski, Abdominal Sleep Posture, Fear Paralysis, Landau, Tonic Labyrinthine, and Spinal Perez)

• 15 reflex patterns were assessed to be at the norm/matured level (50%; Bonding, Thomas Automatic Gait, Bauer Crawling, Moro, Hands Supporting, Segmental Rolling, Flying and Landing, Grounding, Spinal Galant, Foot Tendon Guard, Balancing, Hands Pulling, Babkin Palmomental, Foot Grasp, and Spinning)

• 8 reflex patterns were assessed to be at a high level of integration (26.67%; Pavlov Orientation, Symmetrical Tonic Neck, Locomotion, Asymmetrical Tonic Neck, Trunk Extension, Robinson Grasp, Leg Cross Flexion, Head Righting).

These results of the Post-Assessment show that:

1) all reflex patterns (100%) improved.

2) the majority of reflex patterns moved to a level of complete maturation and integration – 76.67% patterns.

3) 26.67% of reflex patterns out of the above matured reflexes (76.67%) moved to a high level of integration.

4) Reflex Profiles of gifted children after MNRI® intervention program show significant and fast improvement of reflex patterns (for 76.67%) meaning their ability to learn quickly also takes place on the level of automaticity. The coefficient of change is significance and thus, valid - 0.47 before the MNRI® program and 0.62 after; $p < 0{,}001$).

5) the MNRI® program supports the maturation of reflex patterns and can solve the problem of asynchronicity in neurodevelopment of gifted children to a significant extent.

This new data is unique and shows the importance and possibility of facilitation of neurodevelopment of gifted children through reflex integration. This allows one to presuppose that integration of reflexes can correct asynchronicity.

Conclusions

The MNRI® program was specifically applied in this research to 270 children identified as gifted ranging from 5 to 19 years of age. The study included both a pre and post MNRI® Assessment for children attending 8 day MNRI® Conferences. The study was conducted to create a Reflex Profile of gifted children based on evaluation of the level of reflex pattern maturation and function. It also studied the effects of the MNRI® therapy program on their neuro-reflex integration.

Assessments of reflex patterns in gifted children show specifics of their overall Reflex Profile, which can alert persons in helping professions in creating facilitation programs for their neurodevelopment. It demonstrates that many of their reflex patterns have not accomplished maturation phase, which can be interpreted as a lack of neurosensorimotor integration. It was noted that gifted children often exhibit asynchronicity among their intelligence formation, physical growth, and sensory-motor integration. This frequently results in their social, emotional, and cognitive abilities developing at different times and levels.

Several clinical observations were noted in this population within the MNRI® program. They were found to exhibit challenges in muscle tone regulation, postural control, motor coordination, and reflex pattern development as well as difficulties with their visual and auditory systems. Their motor coordination was better developed than gross motor coordination in this group.

The initial Assessment revealed that some of their reflexes were considered to be immature. It was found that 20 reflex patterns were assessed to be lower than the normal maturation (66.67%: Core Tendon Guard, Babinski, Abdominal Sleep Posture, Bonding, Thomas Automatic Gait, Bauer Crawling, Moro, Fear Paralysis, Hands Supporting, Segmental Rolling, Landau, Flying and Landing, Grounding, Symmetrical Tonic Neck, Spinal

Galant, Spinal Perez, Foot Tendon Guard, Balancing, Tonic Labyrinthine, Locomotion). Six reflex patterns were assessed to be close to norm in maturation (20%: Hands Pulling, Babkin Palmomental, Asymmetrical Tonic Neck, Foot Grasp, Trunk Extension, Spinning). Three reflex patterns were assessed to be at the norm/matured level (10%: Robinson Grasp, Leg Cross Flexion-Extension, Head Righting). Only one reflex was assessed to have a high level of integration (3.3%: Pavlov Orientation).

After treatment with MNRI®, Assessments showed there was 100% improvement of all reflex patterns. It was found that no reflex patterns (0%) were now assessed to be lower than the normal maturation. The post Assessment further indicated only 7 reflex patterns were assessed to be close to norm (23.33%: Core Tendon Guard, Babinski, Abdominal Sleep Posture, Fear Paralysis, Landau, Tonic Labyrinthine, Spinal Perez). Now, there were 15 reflex patterns assessed to be at the norm/matured level (50%: Bonding, Thomas Automatic Gait, Bauer Crawling, Moro, Hands Supporting, Segmental Rolling, Flying and Landing, Grounding, Spinal Galant, Foot Tendon Guard, Balancing, Hands Pulling, Babkin Palmomental, Foot Grasp, Spinning). To the benefit of these children, 8 reflexes were now assessed to be at a high level of integration (26.67%: Pavlov Orientation, Symmetrical Tonic Neck, Locomotion, Asymmetrical Tonic Neck, Trunk Extension, Robinson Grasp, Leg Cross Flexion-Extension, Head Righting). Therefore, this study indicates that the MNRI® program can correct the asynchronicity of reflex integration of children identified as gifted and talented.

References

Barashniev, J. (2001). *Prenatal Neurology.* (Russ.). Moscow, Russia: Triada-X. 640.

Bernstein, N. (1997). *Bio-mechanics and physiology of the movement*. Moscow, Russ: Moscow-Voroniez.

Bobath, K., Bobath, B. (1984). *The neurodevelopmental treatment.* In: Scrutton D, editor. *Management of the Motor Disorders of Children with Cerebral Palsy.* Oxford, UK: Blackwell Scientific Publications Ltd. p 6–18.

Campbell, S. (2004). *Watch me grow! A unique, 3-dimensional, week look at baby's behavior and development inside the womb.* London, UK: Carroll and Brown Publishers Limited.

Chambliss, A. (2010). *Instructional needs of gifted and talented students. A review of literature.* www.nagc.org.

Child Neurology (2000). Poland, Urban & Partner.

Florintino, M. R. (1973). *Reflex testing methods for evaluating C.N.S. development.* 2nd Edition. Springfield, USA: Charls C Thomas Publisher.

Fulkerson, J., Horvich, M. (1998). Talent development: Two perspectives. // *Phi Delta Kappan,* 79(10), 756.

Eide, B., Eide, B. (2004). *Understanding gifted children - Brains on fire.*

Gagné, F. (1985). Giftedness and talent: Reexamining a reexamination of the definitions. // *Gifted Child Quarterly,* 29, 103-112).

Gross, D. (1987). *Psychology. The science of mind and behavior.* London, UK: Hodder and Stoughton.

Krefft, A. (2007). *Diagnosis of functions of invisible phenomena (Statistic Mathematic Analysis).* Wroclaw, PL: Oficyna Wydawnicza Politechniki Wroclawskiej.

Masgutova, S., Ozerova, S. (1995). The aspects of the psychological work with gifted children having high level of anxiety. // in Book: *Actual problems of psychological assisstance in education.* Material of Regional Conference, June 28-30, 1995 Orechovo-Zouevo, Moscow, (Russ.). p. 36-41, Russia.

Masgutova, S. (2009). *MNRI® Visual and auditory reflexes integration.* Orlando, FL, USA: SMEI.

Masgutova, S. (2011). *Infant dynamic and postural reflexes*. *Neuro-sensory-motor reflex integration*. Revised and edited, scientific-practical manual. Orlando, FL, USA: SMEI.

Masgutova, S., Masgutov, D., Akhmatova, N. (2012). *MNRI: breathing reflex integration. Optimize health and cognitive resources through breathing.* Orlando, FL, USA: SMEI.

Montessori, M. (1995). *The absorbent mind.* New York. Henry Holt and Company. USA. No Child Left Behind Act, P.L. 107-110 (First published in 1949, Title IX, Part A, Definition 22) (2002); 20 USC 7801(22) (2004). (First published in 1949).

NAGC's position paper, *Redefining giftedness for a new century: Shifting the paradigm.* State Definitions of Gifted and Talented.

Naglieri nonverbal ability test or the *Test of nonverbal intelligence.*

National Association for Gifted Children. (2010). *Redefining giftedness for a new century: Shifting the paradigm.* Position Statement, Washington, DC, www.nagc.org.

Nikitin, B. P., Nikitina, L. A. (2004). *We and our children.* (Russ.). Moscow, Russia: Medicina.

O'Reilly, R., Morlet, T., Cushing, S. (2013). *Manual of Pediatric Balance Disorders*. San Diego, CA, USA: Plural Publishing Inc.

Pavlov, I. P. (1960). *Conditioned reflexes: An investigation of the physiological activity of the cerebral cortex.* (Anrep G.V., D. Sc. Trans., 1960). New York, NY, USA: Dover Publications Inc. (First published in 1927).

Piaget, J. (1936). *Origins of intelligence in the child.* London: Routledge & Kegan Paul.

Piaget, J. (1954). *The construction of reality in the child.* (M. Cook, Trans.). New York, NY, USA: Ballantine Books.

Renzulli, J. S. (1978). What makes giftedness? Re-examining a definition. *Phi Delta Kappa,* 60, 180-181.

Sadowska, L., Zaleski, A. (2008). *Diagnosis and Therapy of the Psychological and Motor.* Silverman L. (2012). Upside Down Brilliance. website.

Spheres in Development Rehabilitation. // in: Sadowska, L. (Ed.). *Neurophysiological correction methods for children with developmental disorders.* AWF, Wroclaw 9-49.

Sechenov, I. (1995). *Physiology of behavior. Scientific works/* Edd.: Moscow. (Russ.). Russia: M. G. Jaroshevsky. (First published in 1863.)

Sherrington, C. (1947). *The integrative action of the nervous system.* London, UK: Cambridge University Press.

Silverman, L. (2002). *Upside-down brilliance: The visual-spatial learner.* Denver, CO, USA: DeLeon.

Syka, J., Merzenich, M. (2003). *Plasticity and signal representation in the auditory system.* New York, NY, US: Springer Publishing Co.

Vygotsky, L. (1986). *The Child Psychology. The Problems of Child Development.* In 6 Books. Book – 4. Moscow, Russia: Pedagogika.

Vygotsky L. (1962). *Thinking and speech.* (Edited and translated in part by Eugenia Hanfmann and Gertrude Vakar, and in part by Norris Minnick). Boston, MA: The M.I.T. Press (First published in 1934).

Wescher intelligence scale for children, 4th Edition. Read NAGC's position paper Use of the WISC-IV in Gifted Education

http://www.nagc.org/resources-publications/resources/my-child-gifted#sthash.dRnoctpF.dpuf

http://www.nagc.org/resources-publications/gifted-education-practices/identification/tests-assessments#sthash.V2W7Hnfm.dpuf

Dear children, Thank you for your participation in our work and for helping us to understand that the reflex integration is also important for gifted people because it can facilitate motivation and a desire for better and more active expression of our talents. – Authors.