

**The Impact of Masgutova Neurosensorimotor Reflex Integration
on On-Task Student Behavior**

By

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Abstract

The purpose of this research project was to study how Physical Activity (PA) can impact behaviors in a classroom setting. This study implemented PAs from the MNRI program to determine its impact on students' on- and off-task behaviors. The study took place in a public Montessori school located in a medium-sized upper Midwestern city. There was a total of 16 children in the classroom and the grade levels included both first and second grade students, ranging from ages six to eight years old. Over the span of the six-week study (only Mondays, Tuesdays, Thursdays, and Fridays were days of observations due to COVID-19), students' on- and off-task behaviors were observed. A combination of both quantitative and qualitative data was collected, and the results of the study showed that MNRI PA does aid in student behavior in a lower elementary Montessori classroom. The effects on the activities showed that there was an increase in on-task behaviors and a decrease in off-task behaviors post-intervention beginning the second week of intervention. This study also includes extensive descriptions of the MNRI archetypes and illustrations of the infant reflexes made available by permission from Dr. Masgutova.

Keywords: MNRI, physical activity, on- and off-task behavior, elementary education, Montessori education, Masgutova

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Literature Review

Physical activity (PA) in the classroom has an impact on student learning. When students are restricted to their chairs/desks/tables for long periods of time, this immobility can potentially lead to undesirable behaviors in the classroom. In fact, many schools across the nation have incorporated movement breaks in the classrooms to address this documented and growing need that results from too little PA. There are various programs that promote PA and this diversity prompts the question of which one to choose? The PA intervention programs TAKE 10!, Instant Recess, CATCH, and non-evidenced based PA have been found that there were positive impacts on student behavior (Bonilla et al., 2015).

PA and the Mind

Many PA activities include a component of mindfulness. The benefits to engaging in mindfulness activities in a classroom can possibly lead to increased student focus and on-task behaviors. When students intentionally move and can think through their thought processes, they engage in higher order thinking. Delagran (2016) shares that research suggests that the practice of mindfulness can help improve attention, memory, and cognitive performance. The ability to focus attentively on work engages both the mind and body. Being able to develop such skills can impact students' behaviors in the classroom.

In a series of PA interventions, various programs were studied to see their effects on the mind. The results showed that acute opportunities for PA influenced cognition (Erickson et al., 2019). The influence of these activities included: increased processing speed, attention, and memory. Although it is important to note that discrepancies were found with the attention span findings. Therefore, it is still somewhat inconclusive as to the *comprehensive effects* acute PA

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has on certain aspects of the mind. In order to determine the quantity of PA needed, further research would need to be conducted.

Frequency/Duration of PA

Since research has shown that there are positive impacts of PA in the classroom, it is the Center for Disease Control and Prevention's (CDC) recommendation that children ages six through seventeen should target 60 minutes of moderate-to-vigorous physical activity a day including daily aerobic and bone strengthening activities three times a week (2020). With the expansion of standardized testing, many schools have cut down the amounts of time for students to engage in PA. Given this decrease of PA in schools, it is harder for students to reach the minimum time recommended by the CDC for PA. When majority of a student's school day is spent in sedentary behavior, this immobility can lead to more off-task behaviors in the classroom. The question is not whether PA breaks can help students stay on task but rather, what frequency of PA breaks are needed in order to see positive impacts on student behavior.

To address the question of frequency, research using the TAKE 10! PA program was undertaken (Goh, et al., 2016). The study suggests prolonged sitting at a desk all day during instructional times at school may result in increased off-task behaviors in students. Nine classes from 3rd -5th grades were used for the study where they utilized the TAKE 10! physical activity intervention and measured student on-task behavior through systematic direct observations. Following the baseline period of four weeks, the efficacy of the eight-week intervention employed a methodology of one PA intervention per day. The results showed that there was a difference of 7.7% decrease in on-task behavior during the baseline of no PA intervention, representing a 7.2% increase in on-task behaviors following the intervention. Overall, the study showed that there were more on-task behaviors when TAKE 10! was administered in comparison

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to when it was not. It appears that incorporating at least just one intervention daily positively impacted the students. A follow up question would be how long the duration of the PA would need to be, in order to see its effect on students.

Henriksen et.al. (2017) explored how one-minute energizers in elementary school classrooms held an impact on students. The nine-week design was divided up as follows:

Table 1

Henriksen, Minton, and Raney Research Design

Week	Protocol
1	Teacher training and baseline testing
2	Teacher training and baseline testing
3-8	Six-week intervention. The intervention included six intervention classrooms. Both experimental and control teachers introduced two 1-Minute Energizers or control lessons. There is a total of nine energizers. These energizers introduce the topic of the human body while incorporating information of health and body. Students move as they learn specific lessons, which can relate to science, math, and music. They were told not to exceed 10 minutes of the introduction to these movements. Teachers recorded the time spent on each topic daily.
9	Post-intervention testing

The teachers were instructed to introduce the one-minute interventions with their students but were told to not exceed ten minutes total for the day. At the end of the study, the results yielded that noncompliant and inattentive behaviors were significantly fewer after six weeks of the intervention. They also found that there was a greater percentage of on-task behaviors. It was also noted however, that in previous studies, there were conflicting results with short durations of

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PA in the classroom setting. Due to this, it is still inconclusive if short intervals of PA maintain any lasting effect on student behavior.

Masgutova Neurosensorimotor Reflex Integration program

The Masgutova Neurosensorimotor Reflex Integration program (MNRI) uses motor techniques that assists in dysfunctional primary motor reflexes that are present in individuals. For example, typically developing infants will showcase the Bauer Crawling, Flying & Landing, and Trunk Extension reflex. The Bauer Crawling reflex is present when the infant is on the stomach and the child's foot is pressed against an adult's hand. This leads the infant moving into a crawling position. In the instance when the infant is engaged in the Flying & Landing reflex, this reflex is present when the child is lifted by the hands, leading the legs to flex out. The last example is the Trunk Extension reflex, which is present when the infant is held vertically under the armpits while the toes are touching a surface. This allows for the child's midline and gravity line to come together, leading the child to extend the head and straighten the body out. A comprehensive chart of the various infant reflexes can be seen in Appendix C. Through the treatments of repetitive basic and variant exercises such as the Trunk Extension movement or the Lateral Spine Flexion-Extension movement, the program works to mature and integrate such reflexes (Svetlana Masgutova Educational Institute, 2021) through sensory motor integration.

MNRI was founded by Dr. Svetlana Masgutova during her graduate studies. She received her Doctorate in Developmental and Educational Psychology from the Scientific Research Institute at the Russian Education Academy in Moscow in 1988. The result of the current MNRI program is through the combination of her graduate work on motor reflex and sensory integration and the trauma occurrences of the "Chernobyl disaster (1986-1996), the Baku conflict (1990-1991), the earthquake in Armenia (1989-1999), the train crash in Ufa (1989), the Chechen

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war (1996-1999), conflicts in Israel (2001-2005) and other traumatic situations” (Svetlana Masgutova Educational Institute, 2021). When she worked with the victims of these tragic events, her knowledge of Vygotsky’s and Sechenov’s theories of reflex helped her in aiding them. For example, in the above-mentioned catastrophes, many individuals were experiencing acute post-traumatic stress disorder (PTSD), leading them to psychological damage. With the help of MNRI, patients healed emotionally, psychologically, and physically, and, at greater rates. The train disaster in 1989 left many children injured and traumatized and presented Dr. Masgutova the opportunity to implement her work and theories with numerous young patients. She was currently working approximately 1,360 km away when the train accident that validated her work occurred in Ufa, Russia.

At Ufa, Dr. Masgutova developed real-time techniques that acted to drop the protective guard present in each child’s body. Her approach paid off as the children began to reconnect with the world. Dr. Masgutova remained with the children for months as each child proceeded through their difficult recovery. Their progress was so noticeable that other areas in the hospital became interested in Dr. Masgutova’s work. The burgeoning integration techniques were therefore used with adult survivors as well (Svetlana Masgutova Educational Institute, 2021).

Dr. Masgutova’s program uses purposeful movements that integrates the user’s mind. Through the use of sensory motor integration, these reflex motions help create myelination of the brain synapses. The program incorporates the work of addressing infant “reflexes” which are the foundation movements that develop into an individual’s ability to function. Akhmatova et al. explain reflexes as a

unit of the nerve system presenting an unconditioned physical response to a sensory stimulus (Pavlov, 1927, 1960; Sechenov, 1995, 1961; Sherrington, 1947), supported by a

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network of neural arcs and circuits linking sensory organs, processing centers, and muscles or glands. (Pavlov, 1927, 1961; Sechenov 1995, 1961) (2015, p.33)

Beadling et al. explain that the four basic conditions that can cause infant motor reflex dysfunction are congenital disorder, disease, birth, physical or emotional trauma, and prolonged, frequent, or chronic stress (2015, p. 19). If one of these conditions is present in the child, the autonomic nervous system switches to survival mode, thus making MNRI applicable.

The two bodily states that the autonomic nervous system reverts to are the sympathetic and parasympathetic systems. When an individual is not experiencing a state of alarm, the parasympathetic system allows the body to work normally by resting, digesting, and healing, allowing for bodily growth and maturation. However, when the body goes into a state of alarm, as a defense mechanism, the sympathetic system retreats into a fight, flight, or freeze mode. When the autonomic nervous system is balanced, both the parasympathetic and sympathetic system alternate control based on the body's needs. In the instance when the autonomic nervous system is unbalanced, this can cause physiological, emotional, and behavioral problems. If the sympathetic nervous system takes over, the individual will always be in a fight/flight/freeze response, leading to high amounts of stress on the body. In the occurrence that there is an imbalance, the central nervous system (CNS) will be impacted. The role of the CNS is to “[regulate] and [direct] internal and external responses based on the input it receives” (Beadling, et. al., 2015, p. 20).

There are two sensitivities that an individual can experience, hyperactive or hypoactive. Hyperactive sensitivity response within the sensory system will alert the sympathetic nervous system to over engage in the alarm state. To an individual, minor risks can be perceived as life threatening, leading the person to disengage in various learning activities. Whereas a person

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experiencing hypoactive senses will engage with the parasympathetic nervous system, meaning that the body may fail to register danger, leading to higher risk or life-threatening activities. In either case, neither bodily motor responses are properly integrated, causing complications to the body's growth and development. The incorporation and maturation of the reflex system has been proven to help individuals with reflex motor dysfunction to create balance between the related reflexes and nervous system. While MNRI activities significantly aid in the maturation and integration of reflexes as Dr. Masgutova's work demonstrated when working with trauma patients from the Ufa Train accident. Additionally, the MNRI training can further assist those with normal reflex conditions to gain a sense of self-control and further engage in critical thinking.

While MNRI activities significantly aid in the maturation and integration of reflexes as Dr. Magutova's work demonstrated in injured patients, MNRI can assist individuals with normal reflex conditions to gain a sense of self-control and engage in critical thinking. Over 22,000 professionals have used the program, including teachers (Svetlana Masgutova Educational Institute, 2021). In a classroom setting, there are children with different needs and experiences. Given the broad spectrum of students' needs, MNRI can be instrumental in meeting them in a school setting.

To students who have experienced trauma and whose reflexes have re-surfaced, the specific MNRI movements can help bring back balance to their body, allowing them to function better in the classroom. The movements are also beneficial to those who do not suffer from an imbalance, as it can help students learn how to manage their own behavior, which can lead to academic success. Since the work of the MNRI program has shown success in various areas, Beadling et al. (2015) highlight the use of the MNRI program in clinical settings (pp. 11-

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16). These highlights can be seen in the table below outlining the use of the program in professional and private situations to help individuals.

Table 2

MNRI in Various Settings

Setting/Professional	Impact
Grayce Marie Stratton, Clinical Psychologist	Stratton shared that she was unaware of the MNRI practices, until four of her patients shared their positive experiences with it. She shared that by incorporating these techniques, she saw that her patients (all on the autism spectrum) had a remarkable gain.
Scarlett Lewis, Mother	Lewis' son was tragically killed in the Sandy Hook tragedy. After the tragic incident, Lewis began to showcase many physical reactions. It wasn't until she met up with the MNRI® team, that she realized her physical reactions were caused by PTSD. Her brain had gone into survival mode. With the MNRI activities, this helped Lewis to overcome the physical and mental effects of her PTSD.
Lori Burgess, Speech Pathologist	Burgess shares that MNRI is the missing link that was needed with her patients. Burgess shares that she used to use a series of drills but didn't see results with all patients. Now, she uses the idea of focusing on the reflexes that coincide with the maturation of the limbic and cortex.

Dr. Masgutova outlines various specific motor activities that users can incorporate into each individual's routine. Among those activities are specific physical activities and archetypes that users can incorporate from the program to target specific individual needs. All of which work as an end goal to help the individual.

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MNRI Archetypes and Physical Activities

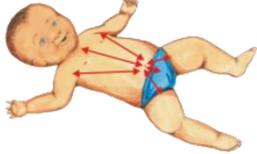
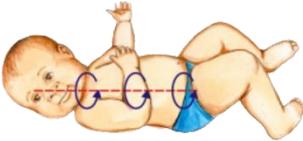
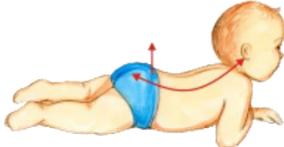
Dr. Masgutova created eight archetype movements which are the foundational actions of MNRI. These movements include a form of stretching and having the user's arm or leg crossing the body's midline. Crossing of the midline allows both hemispheres of the brain to work simultaneously together, allowing for sensory integration, body awareness, and critical thinking skills to develop. These movements help the brain to organize the action, skill, patterns, or performance taking place. They also target the archetype activities that have "remained dormant in the body" (Svetlana Masgutova Educational Institute, 2021). When users re-integrate these motions back into their daily routine, it allows for the body to gain balance, flexibility, and stability.

The archetype movements are created to mimic infant reflexes. These motor movement patterns assist in building structure, function, and motion to the human body. The movements target two parts of the brain: the brainstem and the diencephalon (Masgutova & Masgutov, 2013, p. iii). Masgutova and Masgutov explain that the function of the brainstem is to control physical functioning, serve as a basis for physiological processing, and be a base for protection and survival. The function of the diencephalon, which is in the interbrain system, is to control behavior, emotional development, synthesizing, and execute functions of analysis—such as comparing, noting similarities and differences, aid in hands-on activities, and be a base for comprehension (Masgutova & Masgutov, 2013, p. iii). All eight archetypes integrate the mind which builds the foundation for psychological development. Table 3 breaks up the archetypes by name, movement, and target (Masgutova & Masgutov, 2013, pp. iii-58).

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Table 3

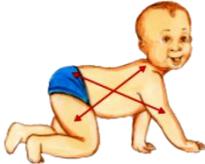
Eight MNRI Archetypes

Archetype Number/Name	Movement	Target
<p>Archetype 1 Six-Ended Star</p>  <p>(Masgutova and Masgutov, 2013, p. 1)</p>  <p>(Masgutova and Masgutov, 2013, p. 1)</p>	<ul style="list-style-type: none"> Phase 1: Locating the center point (below naval), connect each of the following points with a flexion/extension movement: Center to Sternum, Center to Sacrum, Center to Right Shoulder, Center to Left Shoulder, Center to Right Hip, Center to Left Hip. Phase 2: Go into a squatting position, where you will be in flexion of your joints and exhale. Phase 3: Your core body should move into a full extension of joints and then exhale. Repeat this process 3-5 times. 	<ul style="list-style-type: none"> Flexion targets the protection and survival mode, helps with stress, and increases focus and vision. Extension targets peripheral vision.
<p>Archetype 2 Mouth-Spine Rotation</p>  <p>(Masgutova and Masgutov, 2013, p. 7)</p>  <p>(Masgutova and Masgutov, 2013, p. 7)</p>	<ul style="list-style-type: none"> Softly bend the knees and turn your head to the right. Allow your shoulder and hips to follow after the spinal twist as far as you can while exhaling with lips closed. Knees may rotate. Repeat the following step, but with the other side. 	<ul style="list-style-type: none"> Targets the rooting reflex. Integrates the tactile system, motor response, laterality, auditory system, vestibular system, visual system, sensory-motor integration, and spine rotation.
<p>Archetype 3 Trunk Extension</p>  <p>(Masgutova and Masgutov, 2013, p. 13)</p>	<ul style="list-style-type: none"> Stand in a straight posture. Expand the spine and hands are stretched by the side of the body. Push downwards with your arms as you slightly stretch the upper body upwards. Move back into a flexed position where arms are crossed in front of 	<ul style="list-style-type: none"> Brain wave patterns of alpha and beta are activated. Helps with focus on details, awareness, studying, and improving focus and attention.

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 <p>(Masgutova and Masgutov, 2013, p. 14)</p>	<p>the chest and head is tucked forward.</p>	
<p>Archetype 4 Lateral Spine Flexion-Extension</p>  <p>(Masgutova and Masgutov, 2013, p. 19)</p>  <p>(Masgutova and Masgutov, 2013, p. 20)</p>	<ul style="list-style-type: none"> You will start by standing with relaxed knees. Your hands are palm up and your fingers will rest side by side in front of your stomach. Exhale and lift your hands up above your head and lean to one side (your shoulder and hip should align). Repeat the first two steps but switch to the other side when leaning. 	<ul style="list-style-type: none"> Allows individual to access higher brain levels. Helps with processing and expressing information (analyzing and comprehension).
<p>Archetype 5 Homologous Movement</p>  <p>(Masgutova and Masgutov, 2013, p. 25)</p>  <p>(Masgutova and Masgutov, 2013, p. 25)</p>	<ul style="list-style-type: none"> Start with relaxed knees. Your hands are palm up and your fingers will rest side by side in front of your stomach. Keep the back of your fingers together as you move your arms above your head. Make a circle with both arms. As your arms go back to the starting position, exhale. Start at the starting position, but only bring one hand/arm up at a time while exhaling when meeting the center. Switch sides when done. 	<ul style="list-style-type: none"> Activates the Diencephalon (balances hormones and keeps the body's midline centered). Connects to the corpus callosum (helps with communication and processing information).
<p>Archetype 6 Homolateral Movement</p>  <p>(Masgutova and Masgutov, 2013, p. 31)</p>	<ul style="list-style-type: none"> Start with your hands facing palm up at the center of the body. Raise left arm upwards, keeping the elbow bent, but allowing the forearm to be in a horizontal position. Bring the arm up above the head, gently twisting the wrist, so that the palm is facing behind you. 	<ul style="list-style-type: none"> Uses both hemispheres, which target executive and analytical functioning, synthesizing information, differentiation, motor control, eye-hand coordination, and expressing language.

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 <p>(Masgutova and Masgutov, 2013, p. 31)</p>	<ul style="list-style-type: none"> • Leave your arm stretched out and bring it down to complete the circular motion as your hand returns to the center. • Repeat steps but switch sides. 	
<p>Archetype 7 Cross-Lateral Movement</p>  <p>(Masgutova and Masgutov, 2013, p. 41)</p>  <p>(Masgutova and Masgutov, 2013, p. 41)</p>	<ul style="list-style-type: none"> • Bring your right elbow and opposite knee together towards the center of the body, then exhale as you extend them away from one another. • As the limbs are extending away • keep body in a diagonal straight line (right arm stretched straight and left leg outstretched straight) and hold balance on your right leg. • Repeat the steps above but switching sides. 	<ul style="list-style-type: none"> • Targets motor development, coordination, and auditory and visual processing.
<p>Archetype 8 Intentional/Differentiated Movement</p>  <p>(Masgutova and Masgutov, 2013, p. 49)</p>	<ul style="list-style-type: none"> • Bring right elbow to opposite knee (front). • Move left leg behind right leg and tap left leg with right hand (back). • Extend right arm upwards, and left leg out (balancing on right leg), creating a diagonal line (side). • You are going to continue this pattern of front, back, and side. Be sure to alternate sides as you go (right, left, right, and then left again). 	<ul style="list-style-type: none"> • Targets abstract thinking. • Helps to improve thinking, timing, processing, selective perception, and memory.

Over and above the eight archetypes available for classroom use, teachers have an option to incorporate various individual activities in which their students will additionally engage. Some of these activities include Toe-to-Heel line walking, using a Balance Beam, doing Wall Push-Ups, and Finger Mazes. Each of these activities are designed to promote specific motor sensory integration. Dr. Paul Curlee (2015) explains these activities as, “further developed simple

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physical exercises which integrate this reflex, [create] a more balanced physiology and psychological functioning.”

The use of the Balance Beam will help the individual to increase their sense of equilibrium throughout their whole body. With the work of the Wall Push-Ups, this induces the user to participate in a more laborious action. Occupational Therapist Stacy Turke, explains that this heavy work will stimulate these receptors [which] will support motor coordination... These kinds of activities tend to regulate the neurologic system so a calm and focused brain and body can be the result. This is a bonus since getting to “calm” and “focused” is the state that is needed for attention and concentration (2016).

When students exert their physical strength in this activity, they engage in their somatosensory system which informs us about objects in our external environment through touch (i.e., physical contact with skin) and about the position and movement of our body parts (proprioception) through the stimulation of muscle and joints (The University of Texas Health Science Center at Houston, 2020). University of Texas Health Science Center (UTHealth) describes that the four modalities to the senses are pain, temperature, touch, and proprioception. The proprioceptive sense is activated throughout the PA, called a Wall Push-Up. The proprioception system uses the joint tissues, muscles, and tendons as receptor organs. When the body engages in movements that include one or more of these three, a stimulus is sent out to the receptor. The proprioceptive receptors, full of free nerve endings have two kinds of proprioceptors: muscle spindles or the Golgi tendon organs. Muscle spindles signal muscle length/stretching (UTHealth, 2020). These kinds of muscles are used more commonly for fine movements, such as motions with the hands. The role of the Golgi tendon organ is to monitor and signal muscle contraction against a force (UTHealth, 2020). The Golgi tendon organ is

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used during Wall Push-Ups and the tendons and muscles are being used to meet a static force. The benefit of this proprioceptive exercise is that it targets posture and balance and also allows the individual a sense of calmness since the body is exerting force. Research has shown that this activity and other proprioceptive exercises contribute to clearing the user's mind, helping the individual to focus and being more on-task in the classroom.

Just as the other activities help the users to focus and calm the body, the Finger Mazes serve these purposes too. Although there is little research discussing benefits of Finger Mazes on students, the intention of the mazes serves to allow the individual to visually track the path that the finger will take. This integration of the visual and motor systems allows for the individual to remain in a focused state for a period of time and to reset.

Conclusion

As recent studies have shown, PA in the classroom has its benefits to students. It is often harder for students who are bound to a sedentary school life to hit the minimum recommended exercise limit according to the CDC. To address these needs, many schools are looking into PA programs to implement in their classrooms. Many programs have helped engage students in physical breaks, allowing students to move in ways that bring connection to their bodies and minds. A specific program used to address this need is the MNRI program with which users can engage daily in different archetype movements and various independent activities. These activities in turn, bring forth balance and awareness of the mind. As a possible result, on-task behavior can increase, resulting in increased student learning when students are given the opportunity to be intentionally active throughout the school day. To emphasize this concept, Cheatum and Hammond (1999) use a hypothetical case study of Jill, a student (pp. 8-9) in their work, *Physical activities for improving children's learning and behavior*. Jill was a

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student who could sit still and function in school and everyday activities however, when it came time to copying notes from the board, Jill required a significantly longer amount of time than the rest of her peers. When both authors analyzed the situation more closely, they found that Jill was struggling with balance. In this scenario, Jill was holding onto her chair with both hands, but when she needed to use her hands to copy notes from the board, she lost her balance as her hands no longer anchored her. Her poor balance and lack of muscle control negatively impacted her learning. Jill could benefit from some proprioceptive sensory movements to increase her balance which would increase her productivity overall. The incorporation of movement would not only help build a healthy body physically, but also cognitively, and emotionally for all students.

Movement and Montessori Method

Movement is an integral component in the Montessori method. The philosophy of the Montessori method believes in the integration of physical movement in the classroom. Students of the classroom have the freedom to move. This gives students the ability to freely move to access materials and take movement breaks as needed. It is for this reason that Montessori fashioned her materials to include the senses. Montessori's materials allow the students to physically interact with it. "All the sensorial materials involve the use of the hand in a classifying act. The hand and the brain act in unison making a mental connection between an abstract idea and its concrete representation" (Lillard, 1996, p. 36). To Montessori, movement is purposeful. The brain and motor movement work simultaneously. Montessori writes, "Yet living things never move at random. They go toward goals, and their lives follow natural laws" (1995, p. 146). The actions of individuals are the expressions that humans make to accomplish work.

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The nature of a Montessori classroom is to include physical activities. To further investigate the physical movements in a Montessori classroom, Blair et. al conducted a study (2013). In their study, they objectively measured the sedentary behaviors of pre-school children in Montessori and traditional classrooms. The findings showed that children in a Montessori school setting spent less time engaging in sedentary behaviors during and after school. As discussed in their discussion, the authors go on to share that,

The Montessori education system is based on a fundamental approach that encourages children to teach themselves, with teachers serving as assistants in the classroom. Unlike traditional preschools, children in Montessori classrooms are not required to sit and listen to teacher-directed instructions but are encouraged to choose and participate in individual or group activities. (2013, p. 5)

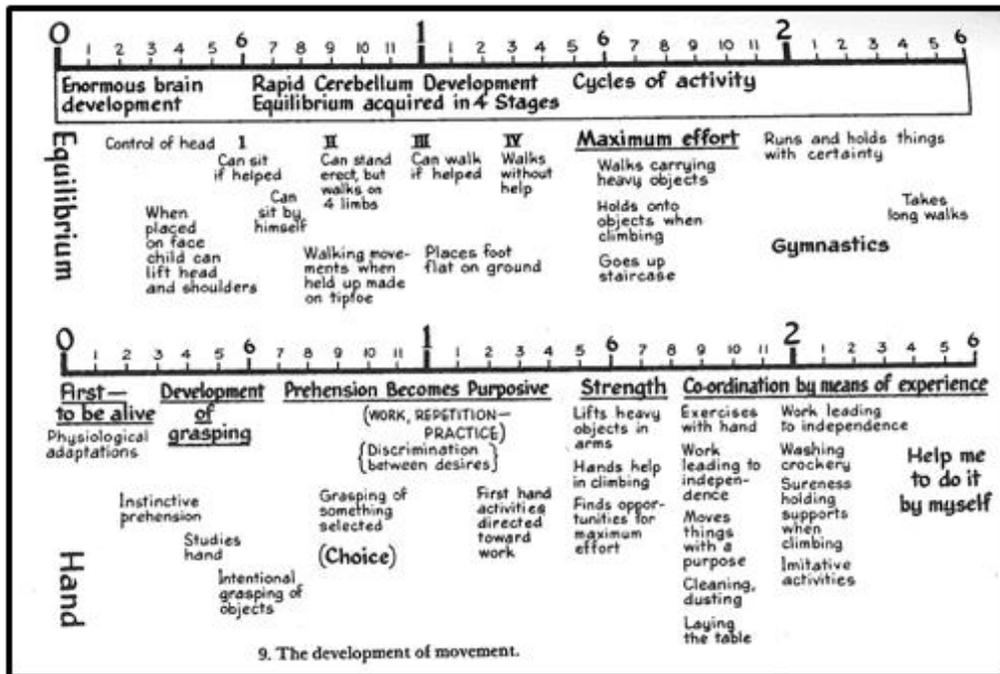
When the children are given the freedom to move about and explore, the children are more involved and physically active throughout the day. Their learning then is not bound to a desk, but rather, to activity.

No human can live without movement. From early on, infants take in information around them using their senses. As they go on, they begin to use movement as a way to gather more information about their surroundings. In Montessori's chart (Figure 1), she explains the progression of movements. The actions that young children make are the foundational skills that will build them up for future work. In her chart, it shows that children at almost two years of age are beginning to move with purpose. Their actions are becoming more than reflexes. At that point, their movements are connecting to mindful physical activities.

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Figure 1

Movement Progression (Montessori, 1995, p. 149)



Montessori explains that there are three components that unite physical movement (1995, pp. 136-141). In order to create movement, the body must sense. The senses of the body send messages to the brain, and from there, the brain collects information and relays it to the body's nervous system. At this point, the nervous system will react, creating movement. Each component must be seen as a whole, as they are dependent on one another, creating unity within one's body and mind. It is then crucial that when students are in the classroom, that they are purposeful about the movements that they make. Physical activities should serve as a tool to connect the child with purposeful movement, allowing the child to be actively engaged in the classroom. An example of a purposeful movement in a Montessori classroom is Walking the Line which is a distinctly Montessori activity that is not typically used in conventional elementary school settings. The activity is used more frequently in a 3-6 Montessori classroom than of a 6-9 Montessori classroom, however, recent research from the MNRI shows that such

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activities similar to these are beneficial to all children. The line is created on the floor, resembling an ellipse. To create these lines, many Montessori educators will place tape on the floor. Users start at the beginning of the line in a Toe-to-Heel fashion and will continue to walk in that manner all the way around. The goal is to walk directly on top of the line in a focused manner. Lillard describes the benefits to Walking the Line and any sensorial motor movements as,

The sensory and motor systems connect the mind and the body, taking sensory information in from the environment and executing motor acts that change one's position in the environment and the environment itself. Thus, when one attends closely to sensory and motor experiences, one integrates body and mind. (2011, p. 79)

In addition to students walking only on the line, they can also carry a glass of water or balance an item on top of their head. The combination of walking and carrying an item simultaneously integrates the motor and sensory systems for the child.

Research Questions

I have developed this action research in search to see if physical activity will positively or negatively impact students' work cycle in an elementary Montessori classroom setting. After reading various literature about PA, I hypothesized that after the PA interventions, students will more likely be on-task.

Main research question:

How can implementing a minimum of five minutes of MNRI activities daily impact students' on-task behavior?

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Subsidiary questions:

How frequent and long should PA be administered in the classroom to see a change in student behavior?

When is the best time of day for students to participate in PA in the classroom?

Purpose

Physical activity impacts everyone's day to day life. An essential characteristic of living beings is their ability to move. The importance of having movement in a classroom is crucial. When students have an outlet to engage in PA, this can impact their behaviors. The questions that need to be asked is how does PA affect their behaviors? Do students benefit from these activities? Does the frequency and duration of the activities make a difference? When should these activities be administered?

Due to many COVID-19 constraints during this 2020-2021 school year, students are restricted to their seats for longer periods of time in my Montessori classroom. In addition to the cautionary movement restrictions, students are confined to the classroom for majority of their day. With an increase of a sedentary school life, I began to see a rise in disruptions throughout the classroom. These disruptions would then affect students' work cycles. To address the needs of increasing student learning and engagement, my school district implemented the use of the MNRI program across all elementary classrooms. To further support my students, the purpose of my research project was to implement MNRI PA to see the effects of this program on their on-task behaviors.

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Methodology

Setting

The setting of this research took place in a public urban Montessori school located in western Wisconsin. The student population is roughly 300 students, with age groups from Children's House (ages 4 and 5), Lower Elementary or E1 (ages 6-9), and Upper Elementary or E2 (ages 10 and 11). The focus group for this study took place in one of the E1 classrooms.

Participants

There was a total of 16 children present, with their ages ranging from 6-8 whose grade levels fall into 1st and 2nd grade. Table 3 shows the number of students with their corresponding ages in the classroom of where the study took place.

Table 4

Number of Students in the Classroom Per Age Group

Age (Years)	Number of Students in Class	Number of Students Observed from Each Age Group	Number of Students in First Grade	Number of Students in Second Grade
6	1	1	1	0
7	8	3	2	1
8	7	2	0	2

Throughout the entire study, all students participated in the PA intervention, but only six students were chosen to be observed. The following students and their age and their grade are shown in Table 4.

With this study, six students from my classroom were chosen for observation. My choice was based on the interactions I have had with my students. Of each grade, two out of the three

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individuals have had more than five meetings with me to discuss focus and on-task behavior. The third subject in each group has had no meetings with me to discuss focus and on-task behavior since the beginning of the 2020-2021 school year which serves as a control for my study.

Procedure

The Midwestern city school district which employs approximately 1,400 people, offered to licensed teachers, administrators, assistants, and paraprofessionals a weeklong training session at no cost to the employees on MNRI. This opportunity was planned and offered prior to the 2020-2021 school year but ended up being especially propitious due to the pandemic. During the training, participants learned how to implement the various MNRI activities, the MNRI archetype movements, and tools used to promote student growth in attention, positive behavior, and/or body control. Further activities included physically practicing the archetype movements with the instructor, participated in various obstacle courses, and creating the tools for the classroom, such as a Balance Beam and Finger Mazes.

As a participant in this district-wide training, I created a Balance Beam as instructed by our course instructor using two meter-length sticks and some Velcro tape. Additionally, I made finger mazes for which we were encouraged to draw our own designs. Using markers, a dot pattern, and lines, we made any shapes and/or drawings we desired. These Finger Mazes could then be saved and placed inside a sheet protector to be used in our personal classroom later. To teach the archetype movements, I would watch the instructional videos about the archetype movements. The videos were gifted to all participants through the district.

Due to COVID-19 restrictions, our school only offered face-to-face instruction on Mondays, Tuesdays, Thursdays, and Fridays. No intervention or data was collected on

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Wednesdays. This study which lasted six weeks included an initial period (three days) of baseline data collection followed by five weeks of invention and data collection. Table 5 shows which study instruments and archetypes were used in each week. Table 6 gives a further description of the study instruments/tools that were used.

Table 5

Process of Study

Week	Study Instrument	Archetype	Description
Week One	<ul style="list-style-type: none"> • Pre- Student Self-Reflection Tool (Appendix J) • On- & Off- Task Observation Sheet (Appendix E) • End of the Day Student Survey (Appendix F) • Independent MNRI Activity Sign-up (Appendix G) 	Archetype 2 (Mouth-Spine Rotation)	<p style="text-align: center;">Monday</p> <ul style="list-style-type: none"> • No intervention (Baseline) • Pre- Student Self-Reflection Tool given to students. Results can be seen in Appendix D. • Teacher observations made twice in the morning (each observation lasting 10 minutes with a wait period of 2 minutes between the two) and twice in the afternoon (each observation lasting ten minutes with a wait period of 3 minutes between the two). The On- & Off- Task Observation Sheet recorded student behavior. • At the end of the day, students filled out the End of the Day Student Survey. <p style="text-align: center;">Tuesday and Thursday</p> <ul style="list-style-type: none"> • No intervention (Baseline) • Teacher observations made twice in the morning (each observation lasting 10 minutes with a wait period of 2 minutes between the two) and twice in the afternoon (each observation lasting ten minutes with a wait period of 3 minutes between the two).

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			<p style="text-align: center;">Friday</p> <ul style="list-style-type: none"> • First day of intervention and independent PA stations set up for students' use upon choice. • Teacher observations made 10 minutes pre-intervention and 10 minutes post-intervention for a 2-minute-long morning intervention and 3-minute-long afternoon intervention. • At the end of the day, students filled out the End of the Day Student Survey.
Week Two	<ul style="list-style-type: none"> • On- & Off- Task Observation Sheet • End of the Day Student Survey • Independent MNRI Activity Sign-up 	Archetype 2 (Mouth-Spine Rotation)	<p style="text-align: center;">Monday, Tuesday, Thursday, and Friday</p> <ul style="list-style-type: none"> • Independent PA stations set up for students' use upon choice. • Teacher observations made: 10 minutes pre-intervention and 10 minutes post-intervention for a 2-minute-long morning intervention and 3-minute-long afternoon intervention. • At the end of the day, students filled out the End of the Day Student Survey.
Week Three	<ul style="list-style-type: none"> • On- & Off- Task Observation Sheet • End of the Day Student Survey • Independent MNRI Activity Sign-up 	Archetype 3 (Trunk Extension)	<p style="text-align: center;">Monday, Tuesday, Thursday, and Friday</p> <ul style="list-style-type: none"> • Independent PA stations set up for students' use upon choice. • Teacher observations made: 10 minutes pre-intervention and 10 minutes post-intervention for a 2-minute-long morning intervention and 3-minute-long afternoon intervention. • At the end of the day, students filled out the End of the Day Student Survey.
Week Four	<ul style="list-style-type: none"> • On- & Off- Task Observation Sheet • End of the Day Student Survey 	Archetype 4 (Lateral Spine Flexion-Extension)	<p style="text-align: center;">Monday, Tuesday, Thursday, and Friday</p> <ul style="list-style-type: none"> • Independent PA stations set up for students' use upon choice.

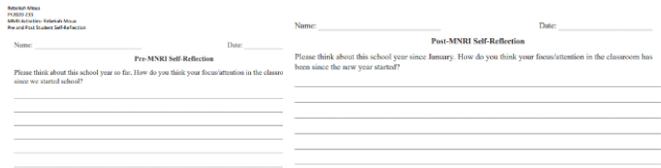
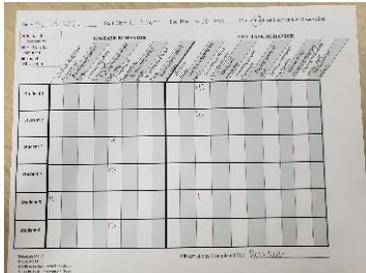
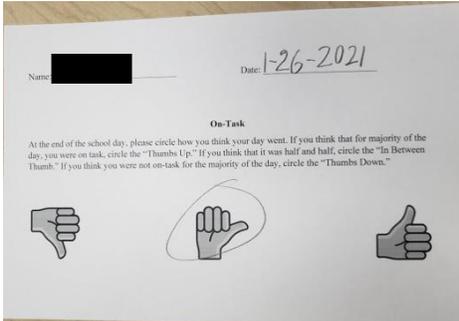
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	<ul style="list-style-type: none"> Independent MNRI Activity Sign-up 		<ul style="list-style-type: none"> Teacher observations made: 10 minutes pre-intervention and 10 minutes post-intervention for a 2-minute-long morning intervention and 3-minute-long afternoon intervention. At the end of the day, students filled out the End of the Day Student Survey.
Week Five	<ul style="list-style-type: none"> On- & Off- Task Observation Sheet End of the Day Student Survey Independent MNRI Activity Sign-up 	Archetype 5 (Homologous Movement)	<p>Monday, Tuesday, Thursday, and Friday</p> <ul style="list-style-type: none"> Independent PA stations set up for students' use upon choice. Teacher observations made: 10 minutes pre-intervention and 10 minutes post-intervention for a 2-minute-long morning intervention and 3-minute-long afternoon intervention. At the end of the day, students filled out the End of the Day Student Survey.
Week Six	<ul style="list-style-type: none"> On- & Off- Task Observation Sheet End of the Day Student Survey Independent MNRI Activity Sign-up Post- Student Self-Reflection Tool (Appendix J) 	Archetype 7 (Cross-Lateral Movement)	<p style="text-align: center;">Monday</p> <ul style="list-style-type: none"> No school <hr/> <p>Tuesday, Thursday, and Friday</p> <ul style="list-style-type: none"> Independent PA stations set up for students' use upon choice. Teacher observations made: 10 minutes pre-intervention and 10 minutes post-intervention for a 2-minute-long morning intervention and 3-minute-long afternoon intervention. <p>At the end of the day, students filled out the End of the Day Student Survey.</p>

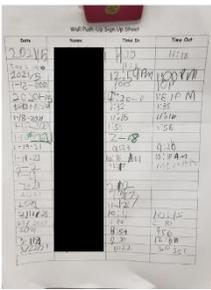
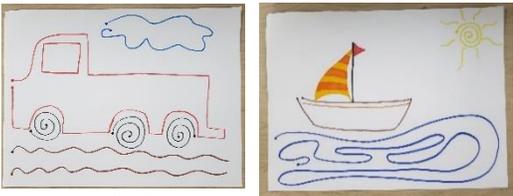
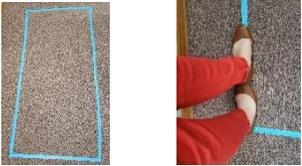
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Table 6

Study Instruments/Tools

Name of Instrument/Tool	Description
<p>Pre- and Post- Student Self-Reflection Tool</p>  <p>Appendix D & E</p>	<ul style="list-style-type: none"> • Before the intervention started, students were asked to reflect how they thought their focus/attention was since the start of the school year until present (before the PA intervention started). This was a free written response. • At the end of our study, students were asked to reflect how they thought their focus/attention was since after winter break (when the study began). This was a free written response.
<p>On- & Off-Task Observation Sheet</p>  <p>Appendix F</p>	<ul style="list-style-type: none"> • Before both morning and afternoon intervention, teacher observations were made 10 minutes prior and after. An initial observation at the beginning would be made with a red mark per student (looking at on- and off-task behaviors). At the 5-minute mark, another observation would be made by a blue mark. The last observation would be made right at the 10-minute mark, noted in black.
<p>End of the Day Student Survey</p>  <p>Appendix G</p>	<ul style="list-style-type: none"> • At the end of each day, students would circle the corresponding hand image to indicate how they perceived their day went. If they thought they were off-task majority of the day, they would circle the hands down image. If they thought they were half on- and half off-task, then they would circle the image with the thumbs in the middle. If they perceived that they were on-task for majority of the day, then they would circle the thumbs up image.

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<p>Independent MNRI Activity Sign-up Sheets</p>  <p>Appendix H</p>	<ul style="list-style-type: none"> There was a total of four independent activities that students could choose to participate in upon their choice. The four choices were Balance Beam, Finger Maze, Toe-to-Heel Line Walk, and Wall Push-Ups. Prior to engaging in the choice activity, the student would sign his/her name on the sign-up sheet indicating his/her name, date, time in, and time out.
<p>Balance Beam</p> 	<ul style="list-style-type: none"> The balance beam consists of two meter sticks velcroid to the floor. Both sticks are parallel to one another. The object of the activity is to walk across the beams without looking down and falling off of them.
<p>Finger Mazes</p>  <p>Appendix I</p>	<ul style="list-style-type: none"> Various finger mazes were drawn. Dots would be used to connect a line. Some mazes would have various lines. Students would locate the dot closest to the upper left corner. Users would then trace the line until they reached the ending dot. Each maze stayed for a two-week period to keep the students' interest in them.
<p>Toe-to-Heel Line Walk</p> 	<ul style="list-style-type: none"> A rectangle was taped onto the section of the classroom floor. To use this activity, the student would find a starting point anywhere on the line. After that, they would walk the line in a Toe-to-Heel fashion.
<p>Wall Push-Ups</p> 	<ul style="list-style-type: none"> In the corner of the classroom, the Wall Push-Up station was set up. To properly use this station, the student would stand vertically in front of the wall with both palms on the wall. The legs should be slightly parted. The student would then insinuate a push-up, extending out the arms out straight, then going back towards the wall.

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Quantitative Data Collection

The process of my data collection was modeled after Tan Leng Goh's study (2016). Goh et al. termed on-task behavior as

verbal or motor behavior that follows class rules and is appropriate to the learning situation. Specifically, a student's behavior is considered on-task if he/she is attentive to the teacher or actively engaged in the appropriate task, as assigned by the teacher. Off-task behaviors can include (but are not limited to) students gazing off, placing their head on the desk, yawning, reading or writing inappropriate or unassigned material, talking to or looking at other students when not part of a given assignment, and leaving the desk without receiving permission from the teacher or teacher's aide. (2016)

With their definition of on- and off-task behavior, I adopted those definitions into my study. To mirror their data collection in my study, I decided to additionally record in a similar manner, making note of student behaviors after specific time stamps. To record the number of on- and off-task behaviors (Appendix F) I observed during all four 10-minute-long observations, I created a document (Appendix J).

There was no set time for when the intervention would be administered due to the nature of a Montessori classroom. Most traditional classrooms have a more rigid classroom schedule that they follow. In a Montessori classroom, it is common for teachers to change their classroom schedules based upon the classroom needs/culture. Many Montessori classrooms are flexible, and this flexibility can change on a daily basis. The time frame that morning interventions would be administered could happen any time between 9:45-11:30 a.m., with the time exception of recess, happening from 10:20-10:35 a.m. The time frame that afternoon interventions would be

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administered could happen any time between 12:30 p.m. to 3:00 p.m., as lunch and after lunch silent reading happened from 11:32 a.m.-12:30 p.m., and recess starting at 3:00 p.m.

As previously stated, the same six students were always observed throughout the entire study. Each student was assigned a number, so that I could keep track of all behaviors from the same individual throughout the study. To make note of students' behaviors pre- and post-intervention (Appendix F), I had three pen colors (red, blue, and black). Ten minutes prior to the intervention, I would take out the observation sheet. Upon taking the sheet out, I would indicate the date, start time, circle "pre" (to indicate that this observation is pre-intervention), make the appropriate marks of student behavior with my red pen. The red marks indicate student behavior at the start of the observation. I would be sure to make a mark under the box indicating what task the student was performing at that very moment. At the five-minute mark, I would have my blue pen out and do the same steps as I did with my red. Lastly, at the ten-minute mark, I would mark the sheet with my black pen and write the end time at the top. I would then engage my classroom in our PA intervention (morning's interventions were always held for two minutes long, whereas afternoon interventions were always held for three minutes long). After intervention, I would take out a new observation sheet and repeat the observation process as stated earlier but making sure to circle "Post" to indicate that this observation is post- PA.

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being mindful of our noise level which had begun to exceed an appropriate level and using our time wisely. After my announcement, Student 1 walked over to the Toe-to-Heel line walk corner and began to walk on the line. When they were done, I saw them walk back to their desk and take out work. The Toe-to-Heel line walk seemed to have calmed them down and allowed them to focus better on their work.

Another occurrence was with Student 3 who showed a similar occurrence as Student 1; however, they showed a preference for the Finger Maze as the independent PA. During the times that Student 3 was at the Finger Mazes, it appeared that this intervention was providing them a means of self-monitoring. For example, several times Student 3 would distance themselves from a group of three peers who often tended to socialize with this individual (one of those individuals is Student 4) and engaged at the Finger Maze station. After Student 3 was done, they would return to their seat and work or find me to check in with me about their work. In addition to contributing to Student 3's own self-regulation, the maze station seemed to also provide a visual cue for the other peers to recognize the need for re-centering. They would not disrupt Student 3 while Student 3 was doing the Finger Maze.

Data Results and Analysis

Data Results

Given the circumstances of COVID-19, the MNRI training has proved to be fortuitous in my classroom. Throughout the 2020–2021 school year, I have seen a rise in off-task behaviors. I noticed an increase in socialization and a decrease in student engagement with schoolwork. The scheduled days of student instruction seemed to throw them off, as students would come in Monday from a two-day weekend, have Wednesday off as a virtual day, and come back for only

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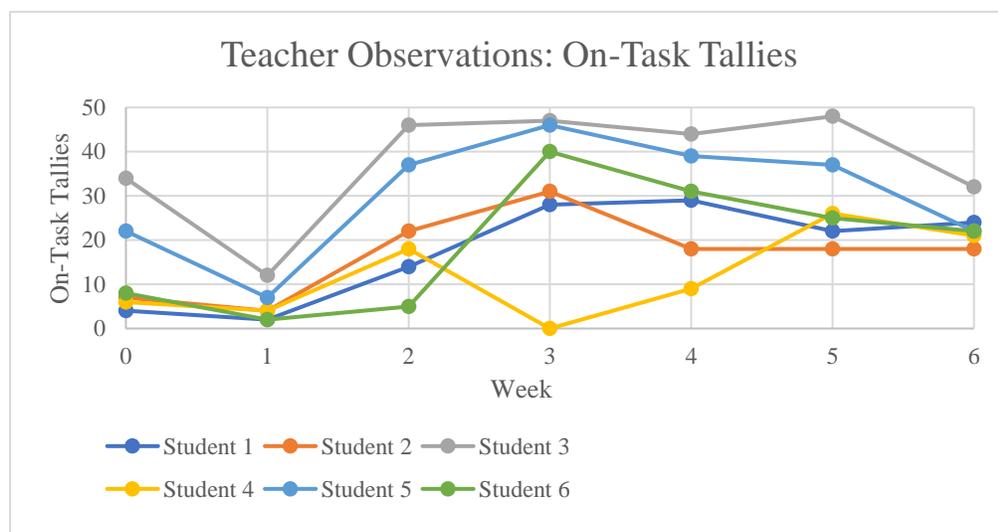
two more days before heading out for the weekend. Due to this schedule, it seemed as though the flow of the students work schedule was often interrupted.

The next following charts showcase the trends of how student on-task behaviors increased, leading to a decrease in off-task behaviors as the MNRI PA intervention was administered. The research study took course over a span of 6 weeks, where three days in Week 1 were reserved for the baseline. I will also share my informal observations since I know my students. First, we will look at the on-task and off-task behaviors over the whole study.

Teacher observations: on-task behaviors

Figure 3

Teacher Observations: On-Task Tallies



The data above shows all on-task results for the entire six-week research study. The first data point collected shows the results for the baseline (Monday, Tuesday, and Thursday of Week 1). The second data point shows the results for the first day of intervention (Week 1). The receding numbers then represent what week the on-task tallies were collected from.

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The graph shows that overall, there was an increase in on-task student behavior. During the first few days of administering the PA intervention, student perception on the actual movements were low. Many students made comments about how they felt silly while participating in the movements. To address this, I discussed with my students real life examples of the importance of stretching. I told them that before athletes participated in their sports, whether that be football, soccer, or dance, they stretched beforehand. This stretching allows for their bodies to warm up, but above all, it helps them to focus. To further stress the importance of the archetype movements, I discussed why Dr. Masgutova created the MNRI program and shared how it has helped patients healed from the Ufa train accident. After holding these conversations, students were more understanding about the reason behind why we were incorporating these movements into our daily schedule.

The minimum value was 2 tallies (Student 6), and the maximum value was 48 tallies (Student 1). Student 4 received a “0” for Week 3, however, this was due to having to quarantine because of COVID19. Student 6 is one of the students with whom I conferenced often pre-intervention about their off-task behaviors in the classroom. A possible explanation to their low values of on-task behaviors could be explained by the change of dosage in their medications. During the time of the research study, Student 6 was receiving medication to help with their ADHD. Student 6’s mother was in contact with the doctor in terms of finding a dosage and time frame that would help Student 6 with focus and attention in the classroom.

In the occurrence of Student 3, they are one of the control students. I purposefully chose this student as a control under the context that they have never had a conversation with me about their behaviors in the classroom. This student is often on-task and is a model of student engagement.

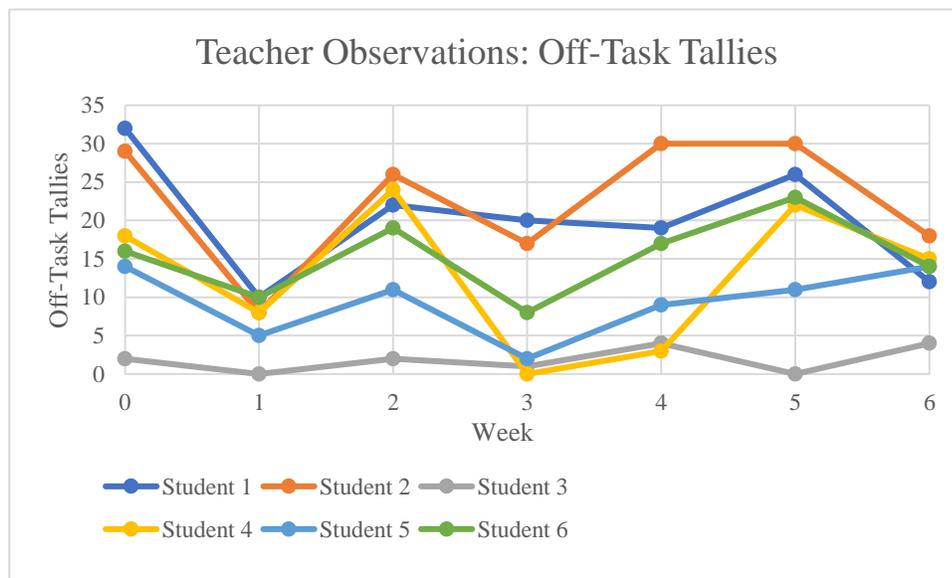
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Overall, all students, with the exception of two students (Students 3 and 5) showed an increase in on-task tallies when comparing the baseline to the last week of the PA intervention. Although Student 3's on-task tally did decrease, they were always "on-task" from all observations throughout the entire research study. However, after the first PA intervention, there was a major increase in on-task behaviors during weeks 2-5 in comparison to the baseline. All on-task tally averages were also higher than the baseline and first day of PA intervention tallies, therefore, the data shows that in my classroom with this particular group of students, the PA intervention-positively impacted students' on-task behavior.

Teacher observations: off-task behaviors

Figure 4

Teacher Observations: Off-Task Tallies



The minimum value was 0 tallies (Student 3), and the maximum value was 32 tallies (Student 1). Again, it is not surprising that Student 3 would have lower values for off-task behaviors, as they were a model student for student engagement. It was interesting to observe that they would pick up cues as to when I would observe. Whenever Student 3 saw that I was

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observing with my clipboard, if they were off-task (i.e., socializing with peers), then they would return back to their desk to work. Student 3 seemed to be able to regulate their behaviors under the basis of teacher cues. In the case of Student 1, they were chosen for this research, because they needed to be re-directed on a daily basis. Student 1 was not only struggling with being engaged and productive at home but was also struggling at home per the daily conversations I had with their mother. During the course of my research, Student 1 underwent a screening for ADHD and was diagnosed with it from his doctor.

Overall, all but two students (Student 3 and 5) showed a decrease in off-task behaviors in comparison from the baseline to Week 6 of PA intervention. All student averages for the Weeks with PA intervention were also lesser in value of the baseline for all students. The data support that PA, as little as five minutes a day in my classroom can decrease the total amount of off-task behaviors.

On and Off-task Behaviors Chart – Teacher and Student

I thought it would be interesting to compare how students perceived themselves in comparison to my observations. Ultimately, the goal of this comparison should show me if my students were able to self-reflect critically on their day's work. If their student responses (Thumbs Up, Thumbs in the Middle, or Thumbs Down) matched up with teacher observations (On, On/Off, or Off), this showed that the students were able to achieve higher order of thinking.

Based upon the teacher observations that were collected, students were either assigned "On," "Off," or "On/Off" per day. To determine which category the students would be assigned to for the day, the total amount of tallies was counted for all four observations. Each student could receive a total of 12 tallies a day because there were four observations, and each student

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could receive three tallies which is presented in Table 8 along with the parameters (the numerical value of the tallies) for the teacher's descriptors and the icons (Thumbs Up, Middle, or Down) for the students' perceptions.

Table 7

Teacher Descriptor vs. Student Perception

Number of tallies	Teacher's Descriptor	Students' Perceptions
Over 6 tallies	On-task	
Under 6 tallies	Off-task	
6 tallies	On/off task	

After totaling all tallies for Teacher's Descriptor and Students' Perceptions (Appendix K), the percentages of those numerical values were analyzed (Figures 5 and 6). The following data shows that there is a discrepancy between teacher descriptors/observations and students' perceptions (a further break down of students' perception can be found in Appendix L and a side-by-side comparison between teacher descriptors and student perceptions can be seen in Figures 7 and 8).

As we noticed in Table 7, the students used a Thumbs Up, Middle, or Down, to describe their on-task behavior. I would count the daily tallies to decipher if students were either On-, Off-, or On/Off-task to describe their behaviors for the day. Figures 7 and 8 displays the interesting data that shows the blatant discrepancies of teacher's descriptors being on-task vs. students' perceptions of being on-task as well as with the off-task results. This was an unexpected, but very informative outcome. To calculate the percentage in Figure 5, I took the total tallies of either On-, Off-, or On/Off-task and divided that out by the total tallies that was

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accumulated throughout the entire research study. The percentage in Figure 6 was calculated by the total accounts of when students either circled Thumbs Up, Middle, or Down which was then divided by the total days the students indicated their daily reflection.

Figure 5

Percentage of Numerical Value of Tallies from Teacher Descriptors/Observations

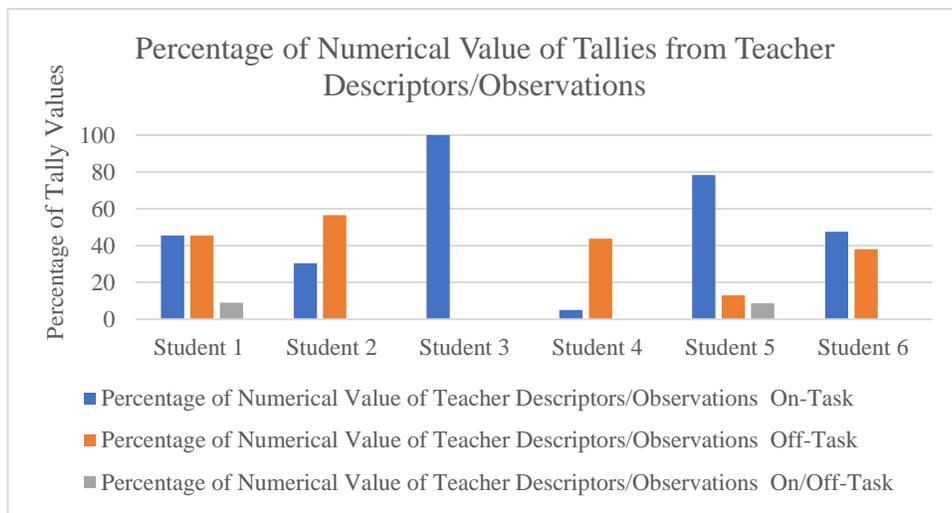
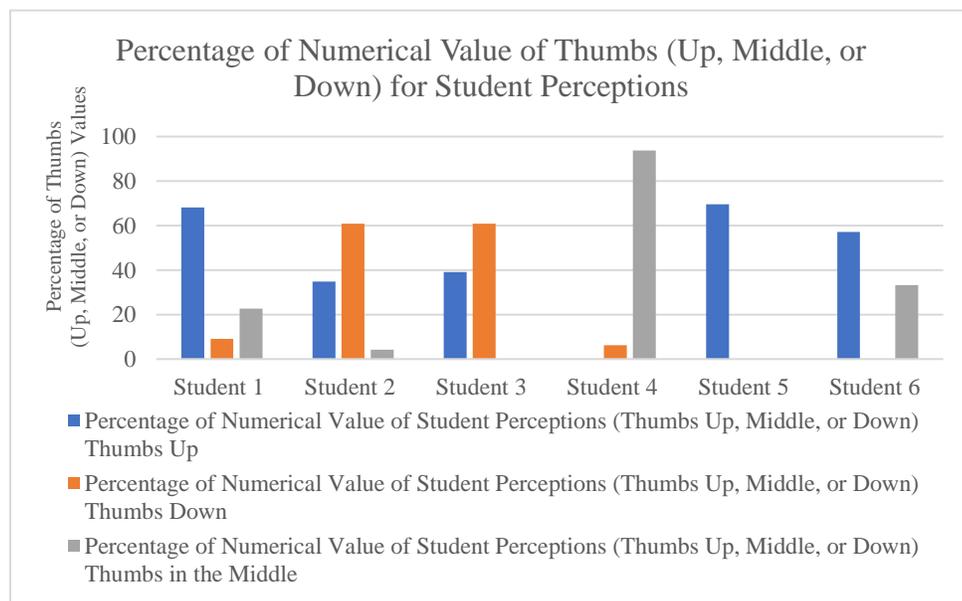


Figure 6

Percentage of Numerical Value of Thumbs (Up, Middle, or Down) for Student Perceptions



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Figure 7

On-task Averages for Teacher Descriptors and Student Perceptions

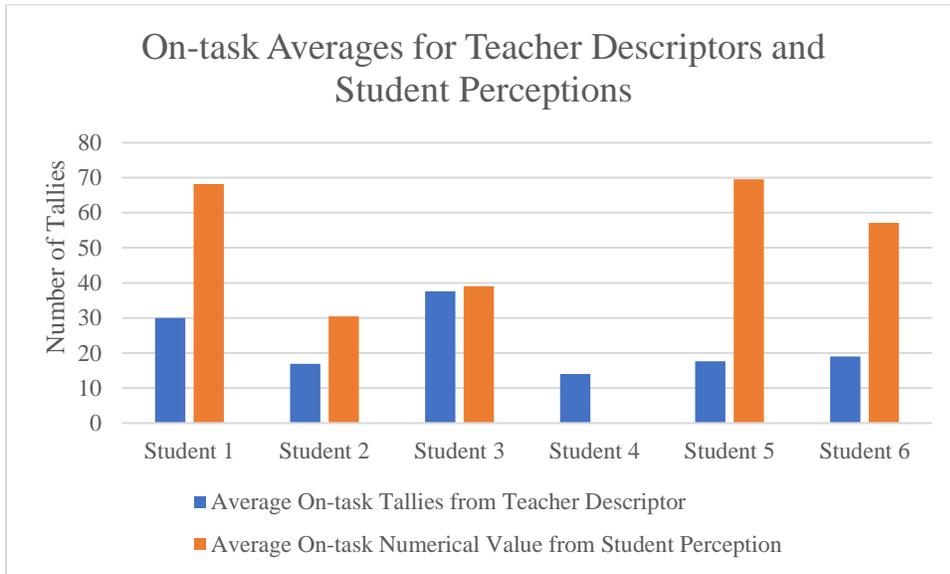
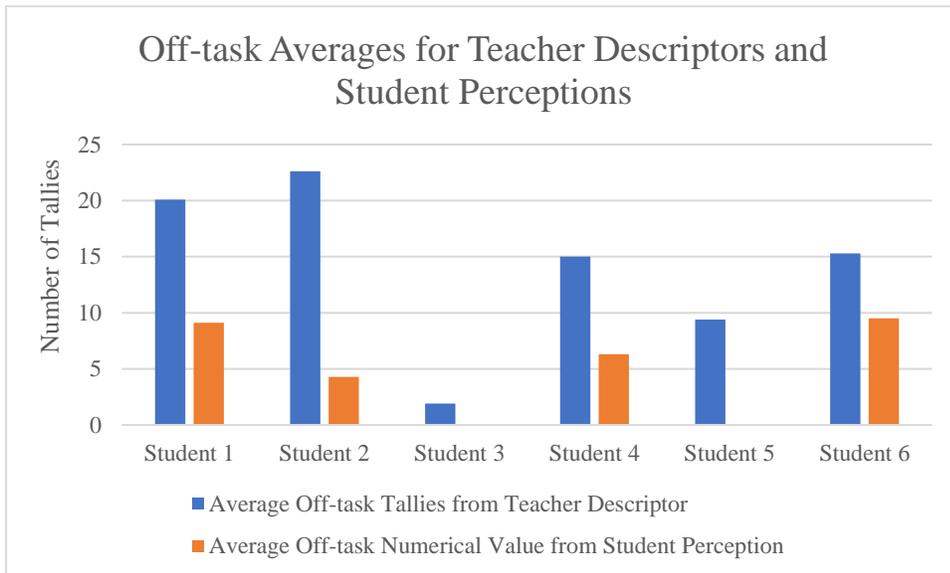


Figure 8

Off-task Averages for Teacher Descriptors and Student Perceptions



With Figures 7 and 8, most students perceived themselves as being on-task despite the teacher's descriptors as off-task and as well as the reverse. It is possible that students believed

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their days went well, because I make an effort to end the day positively. Towards the end of the day, as the last step before we head out for recess, my students clean up the classroom. This opportunity allows them to take responsibility for the classroom, leading them to feel accomplished after the task has been completed. After our classroom has been cleaned, this is when students filled out the End of the Day Student Survey (Appendix G), indicating Thumbs Up, Thumbs in the Middle, or Thumbs Down. Since the survey was taken directly after a major responsibility in the classroom, students may have indicated a Thumbs Up icon regarding to their actions/behaviors during the cleaning session vs. the span of the entire day.

Although students' engagement did increase due to the movements, their level of self-critiquing is still developing. Most students were able to note as to when I was observing, and would react according to it (i.e., if they were off-task, they would find something to switch to being on-task or they would comment that I would be observing). This shows that they are aware of teacher cues but have yet to learn self-regulation.

Independent MNRI activities

The first day of the PA intervention and independent activities in which students could choose to participate at any time during the day started on January 15, 2021. Despite the four independent activities (Balance Beam, Finger Maze, Toe-to-Heel, and Wall Push-ups) being open since near the beginning of the research study, students did not utilize the stations often. Appendix M showcase the number of minutes and frequency the activities were used. The total minutes students used in the independent activities were collected, where Table 8 outlines the results.

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Table 8

Total Minutes Used for the Independent Activities

Independent PA	Total Minutes Used
Balance Beam	14 Minutes
Finger Maze	10 Minutes
Toe-to-Heel	19.5 Minutes
Wall Push-Ups	6 Minutes

The total minutes for all independent activities totaled 49.5 minutes. This number is low in comparison to the total number of minutes of the four independent activities being available for use. Even though the six students did not utilize very frequently the independent activities throughout the research study, ironically these same activities were a popular choice among my other students. Through informal observations, I noticed that the other students would either favor the Toe-to-Heel or the Wall Push-Ups station. Those students seemed to enjoy the labor-intensive works from these stations and would often visit the stations multiple times daily throughout the entire research study. After the students (who are not in the study) had finished up their independent activities, I would see them return to their seats and restart their work. There was a particular student who loved the Wall Push-Ups station. This student would often socialize with Students 1 and 2. Upon conferencing with this student, they said that they would try to distance themselves from Students 1 and 2, but the two would still pursue conversations with them. Upon hearing this, I told this particular student to either walk away from Students 1 and 2 or to remind the two to go back and work. After this conversation, I would often see this student walk away from Students 1 and 2 to use the Wall Push-Ups station. If the two tried to socialize with this student afterwards, the student would also remind Students 1 and 2 to go back to their

MNRI ACTIVITIES IN THE CLASSROOM

seats to work. The independent PA seemed to help this student back on track, additionally as it also allowed for them to remind Students 1 and 2 to do the same too.

Time of Day Comparison

One of my subsidiary questions was related to the effect of PA depending on the time of day. To explore whether the PA intervention impacted morning or afternoon better, the data from Appendix J was analyzed. Percentages were calculated between pre- and post-observation/intervention for both morning and afternoon. Appendix N shows the percentages broken up between morning and afternoon of every day from the study. The following information from Appendix N was used to determine which time of day for the PA intervention was more beneficial. Whichever (morning or afternoon) had a higher increase in percentage for on-task behaviors from pre- to post-intervention, would be determined a more effective time frame. In the instance that there was no change, then information collected from the teacher's observations (Appendix F and J) would be used to help determine the more effective time frame (i.e., if all students were on-task pre- and post-intervention, then this information would be considered). Table 8 shows the results of which time of day (morning or afternoon) for PA was more beneficial.

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Table 9

Time of Day Comparisons for PA Interventions

“Afternoon” is shaded gray.

Weeks	Which time of day did PA intervention positively impact more?			
	Monday	Tuesday	Thursday	Friday
Week 1	Afternoon	Afternoon	Afternoon	Morning
Week 2	Afternoon	Morning	Morning	Morning
Week 3	Afternoon	Morning	Afternoon	Afternoon
Week 4	Afternoon	Morning	Afternoon	Afternoon
Week 5	Afternoon	Morning	Afternoon	Morning
Week 6	NO SCHOOL	Morning	Afternoon	Morning/Afternoon

A trend from Table 9 shows that on Mondays and Thursdays, PA interventions impacted the afternoons more positively than the mornings did. I noticed that on Mondays and Thursdays, students took longer to settle into the classroom, due to the break (weekend and Wednesdays were a virtual school day). When students trickled into the classroom during Monday and Thursday mornings, they were high energy and in the mood for socialization. Their need for socialization typically did not slow down until mid-day. This could explain the trend from Table 9, because students have had all morning to settle in and were more receptive to the PA intervention by the afternoon.

Another trend from Table 9 shows that on Tuesdays and Fridays, PA interventions positively impacted the mornings more than the afternoons. These two weekdays were the second days that students were face to face in school. Due to COVID-19, students went from a

MNRI ACTIVITIES IN THE CLASSROOM

five-day (face to face) instructional school week to four days (Mondays, Tuesdays, Thursdays, and Fridays were face to face) instructional school week. With the 2020-2021 school year, Tuesdays and Fridays were students second consecutive day of school. Through informal observations, students were more on-task on the second consecutive day of school, as they were still in the routine for schoolwork. This observation supports the trend seen in Table 9.

Overall, the findings showed that there was a total of nine days supporting morning interventions, 13 days supporting afternoon interventions, and 1 day supporting that both are equally beneficial. The time limit may also play a factor into the results, as the morning PA interventions were held for two minutes long, and the afternoon PA interventions were held for three minutes long. Therefore, it cannot be concluded based upon my data collected alone as to whether morning or afternoon PA interventions are more beneficial.

Referring to my standard observation notes, I reflected that having the room set up with stations was beneficial for the students. The stations seemed to be a productive choice to counter socializing, playing, or other off-task behaviors. With most students who used the independent PA stations, it was often the case that they would seek work after the activity. In retrospect, it would be beneficial to have recorded the occurrences since my notes showed that they were rather frequent. The PA served as a way to help the students gain focus and provide a break from what they were previously doing.

Follow Up Considerations

I have gained several insights from this study that can potentially impact my teaching. The study has further reinforced the importance of PA in my classroom, especially during COVID-19 where students' movements were more restricted than ever. Furthermore, it was

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insightful for me to learn that just as little as two minutes twice a day of PA can impact students' behavior positively.

A further insight I gained was related to the length of time for the daily PA interventions. If I were to do my study again, I would make the morning and afternoon interventions the exact same time. In this study, because the time limits were different, I could not draw firm conclusions as to whether the morning intervention yielded better results than the afternoon interventions, or vice versa. Next time, I would set the time limit of both PA interventions to two minutes. I would also make sure that the interventions were performed at the same time every day, as that would help keep consistency throughout the study. Additionally, I would be certain to gather qualitative data when students used the independent PA, making notes of how their behavior was pre- and post- PA. I would also provide students with more choices of independent PA, as this could promote further student engagement. With the addition of more independent PA and collecting qualitative information, this could further support the hypothesis that students are able to regulate their own emotions and actions in the classroom through physical activity.

Another important insight surrounds my modeling of the archetypes. When choosing the whole class MNRI archetype movement, I was sure to know the motions ahead of time. I would watch the videos provided and re-enact them when I was alone. When the time came, I would teach it to the class. Some of the stretches would include bending or twisting of one's body. I did feel a little self-conscious when making the particular movements, as I have never purposefully stretched in front of my class before. When my students learned these movements, I could feel the resistance from them too. I had many students verbalize how silly they thought the movements were. During those times, I would discuss the benefits that these movements have on our bodies and mind. I also shared insight into the work that Dr. Masgutova participated in with

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patients of the Ufa train accident. Upon hearing this, students were more susceptible to participating in the movements. If I were to redo my study, I would teach the students the movements beforehand and offer information about the specific movements before the intervention. I feel as though if students had a positive mindset to it prior to participating in the PA, this could have further impacted student behavior positively.

Further questions to explore is how does student perception impact students' on-task behavior? The study's results were scattered and did not offer much information for this question, but further studies could be implemented to address this topic. Another question to explore is how does student mindset impact student behavior in the classroom? Ultimately, PA can lead to a higher level of thinking skills, so in turn, this can positively impact their mindset.

Conclusion of Research

Based upon the results from the data collected, they showed that implementing a minimum of five minutes of MNRI activities daily (for a minimum of six weeks) can positively impact students' behavior in my classroom during the 2020-2021 school year. The first three days of Week 1 (baseline) and first day of intervention both showed a decrease in on-task behaviors. Starting Week 2 and onwards, an overall weekly percentage showed a gradual percentage of increase for on-task behavior. Afternoon interventions showed greater percentage increase in on-task behaviors post-observation, which could also be explained by the frequency the student has had with the PA intervention. By the time students were engaged in the afternoon PA, it was their second time participating in the movements, whereas the mornings were the students' first PA of the day.

Morning interventions were held for a total of two minutes and afternoon interventions were held for a total of three minutes. With both interventions, the overall percentage results for

MNRI ACTIVITIES IN THE CLASSROOM

on-task behaviors between pre- and post-intervention showed an increase in on-task behavior. PA as little as two minutes can positively impact student behavior in the classroom.

The question whether which time of day, morning, or afternoon, is best for PA seems to lean more towards the afternoon based upon researcher perceptions. Although the results did show higher occurrences of on-task behavior in the afternoon and based upon what I observed informally, students seemed to be more receptive to the PA intervention in the afternoon than in the morning. Since two PA interventions were administered daily, my results can also answer the question that as little as two MNRI PA per day can increase on-task behavior in students.

Furthering the Study

To further my research, I would continue the weeks of the PA intervention. Since Week 2, the percentage of on-task behavior gradually increased. By the end of Week 6, all students were on-task both morning and afternoon for Friday. It would be interesting to see how student behavior is impacted as more weeks are added to the study.

It would also be interesting to see how increased frequency with the PA would impact student on-task behavior. With the increased PA movements, would students benefit from them, or would they cause a disruption to their flow of work? These are all questions that explore the importance of PA in a classroom. PA in the classroom allows students to take breaks when they have sat at their seats for long periods of time. Movement is essential to living beings from birth. Dr. Masgutova has found the importance of recreating movements that address the infant reflexes. When people who have undergone trauma (as well as those who have not) reincorporate these movements back into their lives, these can positively impact their physical, emotional, and cognitive development.

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MNRI ACTIVITIES IN THE CLASSROOM

Appendix A

IRB Approval Document

Date: 3-28-2021

IRB #: IRB-FY2020-233

Title: MNRI Activities-Rebekah Moua

Creation Date: 12-4-2020

End Date:

Status: Approved

Principal Investigator: Kateri Carver

Review Board: UW Institutional Review Board

Sponsor:

Study History

Submission Type Initial	Review Type Exempt	Decision Exempt
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Key Study Contacts

Member Kateri Carver	Role Principal Investigator	Contact kateri.carver@uwrf.edu
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Member Rebekah Moua	Role Primary Contact	Contact rebekah.moua@my.uwrf.edu
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MNRI ACTIVITIES IN THE CLASSROOM

Appendix B

Consent Form Sent to Parents Pg. 1



Informed Consent for Research Participation

IRB # FY2020-233

IRB Approval Date 01/04/2021

Study Title: MNRI Activities- Rebekah Moua

Researcher Names	Department	Contact Information
1. Rebekah Moua	TED	Rebekah Moua 
2. Kateri Carver	TED	Kateri Carver 

We are asking your child to participate in our research study. Participating will not change anything about your or your child's relationship with the researchers or our Departments. Participating or not participating will not change any services you receive from Rebekah Moua or the Chippewa Valley Montessori School.

Overview of the Research

Purpose of the Study	To examine how implementing five minutes daily of the Masgutova Neurosensorimotor Reflex Integration (MNRI) activities with students impact their on-task behavior during an instructional school day.
What will your child be asked to do	I plan to give a pre and post reflection question, asking your child how they feel their on-task behavior is throughout the school day. As a final tool, I also plan to ask your child to fill out a survey at the end of each day self-indicating if they thought they were on-task for the day.
Amount of time it will take you to participate	The study will run for six weeks. Students will be participating daily in the MNRI whole group activities for approximately five minutes.
Risks to your child if your child chooses to participate	The risks to the study are minimal. A possible risk to this study could be a potential accident. Students could possibly feel uncomfortable from participating in certain movements too.
What we will do to reduce the risks	To reduce the risk of a potential accident, students will first clear off their surrounding area, making sure there are no obstructions in their way. Students will also remain six feet apart from one another. An adult will always be in the classroom to supervise all activities. Each child will have the choice to participate or decline their participation in the MNRI movements too.
Benefits to your child or others if your child chooses to participate	Past research has shown that when students sit in their seats for long periods of time, this can lead to potential off-task behaviors. Studies in the past have looked into the impact of physical activities in the classroom. It has been shown that by implementing small breaks of physical activities, there were shown to be an increase in on-task behavior.
Compensation offered to you for participating	None.

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Consent Form Sent to Parents Pg. 2

<u>Confidentiality and Data Protection</u>	
Who will see my answers/information?	The information collected from the surveys, reflections, and observations will be compiled into charts and graphs. These in turn will be submitted to the University of Wisconsin River Falls.
Where will my answers/information be stored?	<p>The precautions that will be taken to safeguard the identifiable records will be that only I will handle all data information. They will be recorded in a private and secured device. After I have recorded the information down, they will be secured in a locked cabinet in my classroom. All results will remain confidential with no identifying information near it.</p> <p>At the end of the study, all hard copies of records will be shredded. Any digital records will be deleted.</p>
How will my answers /information be protected?	All information from the students will be kept confidential. No identifying information will be shared nor near the data collected.
Mandated Reporting Requirements	We are mandated reporters and if we suspect a child or vulnerable adult is being abused or neglected, we are required by law to report this information to local child protection or adult protection agencies or to the police.
<u>Protection of Human Research Subjects</u>	
If I have questions about this research I should contact:	Kateri Carver 
If I have questions or want to complain about my rights or how I was treated as a research participant I should contact:	Institutional Review Board Chair University of Wisconsin River Falls 410 S. Third St. River Falls, WI 54022 (715) 425-0629 irb@uwrf.edu
Signatures:	
<input type="checkbox"/> I agree to participate in this study and understand I may withdraw at any time.	
<input type="checkbox"/> I do not agree to participate in this study.	
<hr/>	
Printed Name of Participant	

MNRI ACTIVITIES IN THE CLASSROOM

Consent Form Sent to Parents Pg. 3

If participant is a minor or requires a Legally Authorized Representative:

Printed Name of Parent, Guardian or Legally Authorized Representative

Signature of Parent, Guardian or Legally Authorized Representative

Date

Please fill out and sign the Consent form. When completed, place it inside the envelope and seal it. Please do not write your child's name on the envelop. The sealed envelope can be turned back to Rebekah Moua.

MNRI ACTIVITIES IN THE CLASSROOM

Appendix C

MNRI Infant Reflexes Chart

Infant Reflexes	Explanation of Reflex
Asymmetrical Tonic Neck reflex (ATNR)	Infant lies down with head turned to the side. The limbs will extend on same body side, leading limbs on opposite side to flex.
Babinski reflex	When the infant's foot is gently stroked from heel to toe, the toes fan out. The big toe extends out and faces the direction of infant's head.
Babkin Palmomental reflex	With the infant on her back, press the center of her palms with thumbs. The infant will open her mouth and bend her head towards her chest. If only one pressure is applied to one palm, the head will bend towards that corresponding side.
Bauer Crawling reflex	Infant is lying on stomach. When the child's foot is pressed against the adult's hand, she will move into a crawling position.
Bonding reflex	This reflex is integral in connecting kinesthetic feeling of integration of the child's body as a whole unit. The reflex is activated when the child is touched on the chest or abdomen as a result of being held by a parent. The sensorial feelings of such actions lead the child to feeling protected and safe.
Core Tendon Guard	When the child falls backwards, the tendon guard reflex activates. The child's toes rises, the body stiffens, and the eyes open wide.
Flying and Landing reflex	The child's legs flex when she is being lifted by the hands and straighten out when they reach back for the ground.
Fear Paralysis	When the child is startled, the body retrieves into a protected mode. The corneal or eyes staring reflex are present too.
Hands Pulling reflex	The child is laying down on her back. When the forearms near the child's wrist is pulled into a sitting position, she will start to pull herself into a sitting position.
Hands Supporting reflex	The reflex is activated when a child (facing downwards) is held under the arms and placed onto a horizontal surface. Upon being in this position, the child will place her hands down.
Landau reflex	When the child is laying on her stomach, she will lift up her head, spine, and legs. The spine is extended backwards, as the head is up and the arms reaching in an upwards position.
Leg Cross Flexion-Extension reflex	When the center of the infant's foot is touched, the opposite leg will move away from the body's midline, then move towards the midline, and will finally extend out.
Moro Embrace reflex	As a result of a fall or unexpected noise, the child will symmetrically spread her arms, un-spread them, and then cry.
Pavlov Orientation reflex	Also referred to as the "what is this?" reflex, this is activated when the child is introduced to a new stimulus.

MNRI ACTIVITIES IN THE CLASSROOM

Robinson Grasp reflex	Touching the upper part of the infant's palm will cause her to grasp.
Spinal Galant reflex	To activate this reflex, the child should be laying on her side or stomach. To the left or right of the spine should be gently touched. In doing so, the child will flex on whichever side was touched.
Spinal Pereze reflex	As the child is laying on her stomach, to activate this reflex, touch the child's spine from tailbone to neck. In reaction, the child will arch her back, flex both upper and lower limbs, and lift her head and pelvis.
Symmetrical Tonic Neck reflex (STNR)	There are three positions. In the first position, the child is on her stomach with her head in flexion, leading to the arms to bend and legs to extend. The second position has the child starting in the "Sphinx" position. When the head extends up, this leads to an arm extension and leg flexion. The last position has the child on all fours. When the head extends, this leads to arm extension and leg flexion.
Thomas Automatic Gait reflex	This reflex causes the child to move forward and spontaneously walk. The infant is held under the armpits, then lifted up vertically with both feet flat on a surface.
Tonic Labyrinthine reflex	The reflex is activated when the infant's head is in the air. The tone of the child's front neck and leg flexors increase when the child is on her stomach.
Trunk Extension reflex	To activate this reflex, the infant is held vertically under the armpits. Her toes should be touching the surface. This will cause the midline to come together with her gravity line. When this occurs, the child will automatically extend her head and straighten out her body.

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Appendix D

Pre- and Post- Student Self-Reflection Tool

Rebekah Moua
FY2020-233
MNRI Activities- Rebekah Moua
Pre and Post Student Self-Reflection

Name: _____

Date: _____

Pre-MNRI Self-Reflection

Please think about this school year so far. How do you think your focus/attention in the classroom has been since we started school?

Name: _____

Date: _____

Post-MNRI Self-Reflection

Please think about this school year since January. How do you think your focus/attention in the classroom has been since the new year started?

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Appendix E

Pre- and Post- Student Self-Reflection Responses

Student	Pre-Intervention	Post-Intervention
Student 1	<p>“Good! So fare.”</p> <p>Teacher Deciphered: Good! So far.</p>	<p>“Good! So fare! I’m nice, cikde, sweet and fun. Everything is grat! I’m finale gitting alog whith [another student]! I thack that I’m having a prity good yere!”</p> <p>Teacher Deciphered: Good! So far! I’m nice, kind, sweet and fun. Everything is great! I’m finally getting along with [another student]! I think that I’m having a pretty good year!</p>
Student 2	<p>“Doing good so far”</p>	<p>“Doing prite good so far. Not the best.”</p> <p>Teacher Deciphered: Doing pretty good so far. Not the best.</p>
Student 3	<p>“I was good so far!”</p>	<p>“I think it was good so far.”</p>
Student 4	<p>“I think I was good.”</p>	<p>“I thik I was asome”</p> <p>Teacher Deciphered: I think I was awesome</p>
Student 5	<p>“Ok”</p>	<p>“Gat”</p> <p>Teacher Deciphered: Great</p>

MNRI ACTIVITIES IN THE CLASSROOM

Appendix F

On- & Off- Task Observation Sheet

Date: _____ Start Time: _____ End Time: _____ Circle: Pre/Post Intervention Observation

- Initial of Observation
- Halfway (5 minutes)
- End of Observation

ON-TASK BEHAVIOR

OFF-TASK BEHAVIOR

	Working on School Assignments	Reading appropriate books	Conversing about Schoolwork	Working to grab or put work away	Attentive to Presentations	Responsibly eating snacks	Working on Choice	Independent MNRI Activities	Head on Table	Reading inappropriate books	Conversing about Non-schoolwork	Staring off into space	Running around classroom	Playing games on iPad	Drawing unrelated to academics	Misuse of any classroom materials	Playing with items on any shelf	Playing out in hallway
Student 1																		
Student 2																		
Student 3																		
Student 4																		
Student 5																		
Student 6																		

Rebekah Moua
 FY2020-233
 MNRI Activities- Rebekah Moua
 On&Off-Task Observation Sheet

Observations Completed By: _____

MNRI ACTIVITIES IN THE CLASSROOM

Appendix G

End of the Day Student Survey

Rebekah Moua
FY2020-233
MNRI Activities- Rebekah Moua
End of the Day Student Survey

Name: _____

Date: _____

On-Task

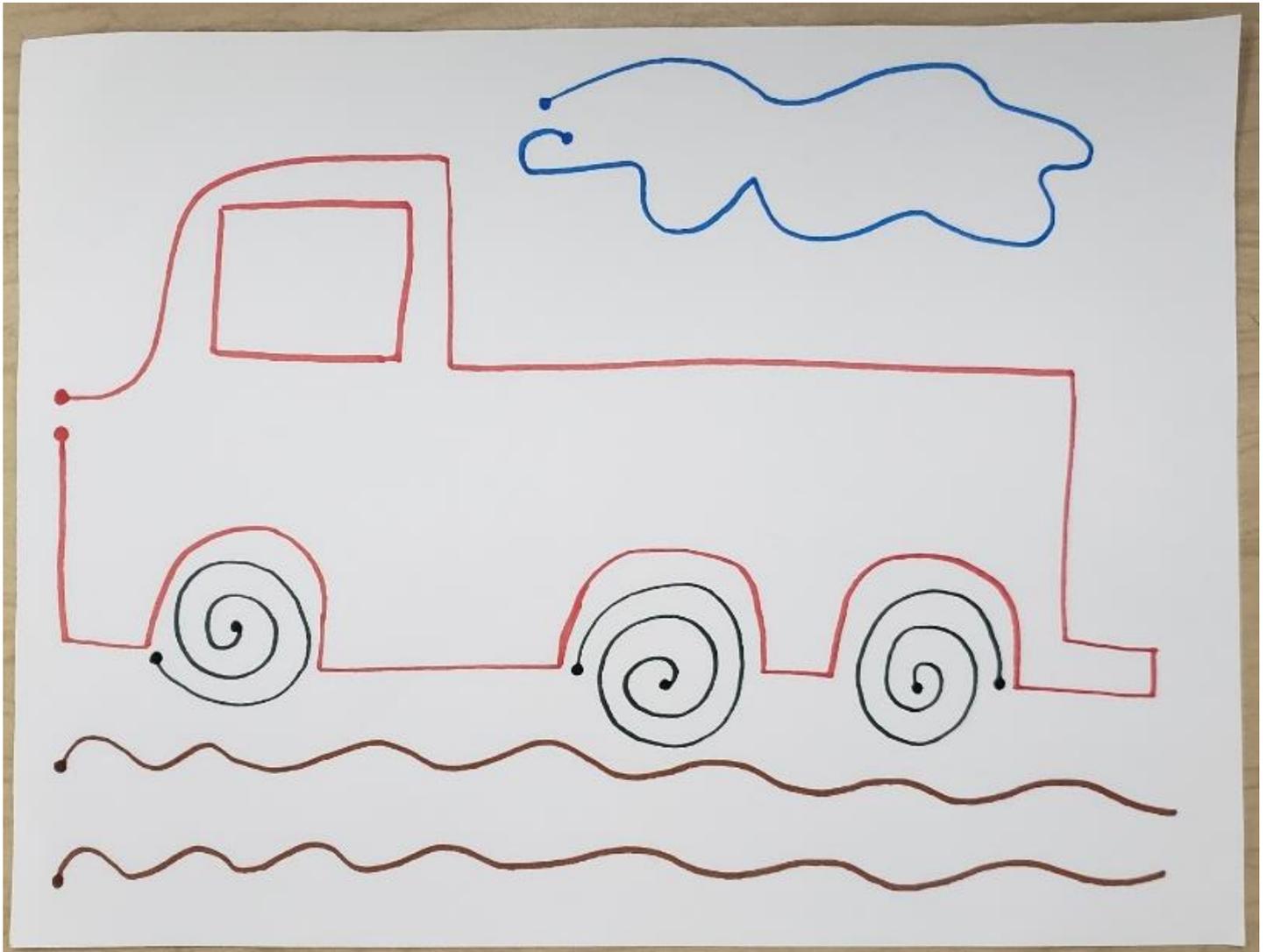
At the end of the school day, please circle how you think your day went. If you think that for majority of the day, you were on task, circle the "Thumbs Up." If you think that it was half and half, circle the "In Between Thumb." If you think you were not on-task for the majority of the day, circle the "Thumbs Down."



MNRI ACTIVITIES IN THE CLASSROOM

Appendix I

Finger Maze #1



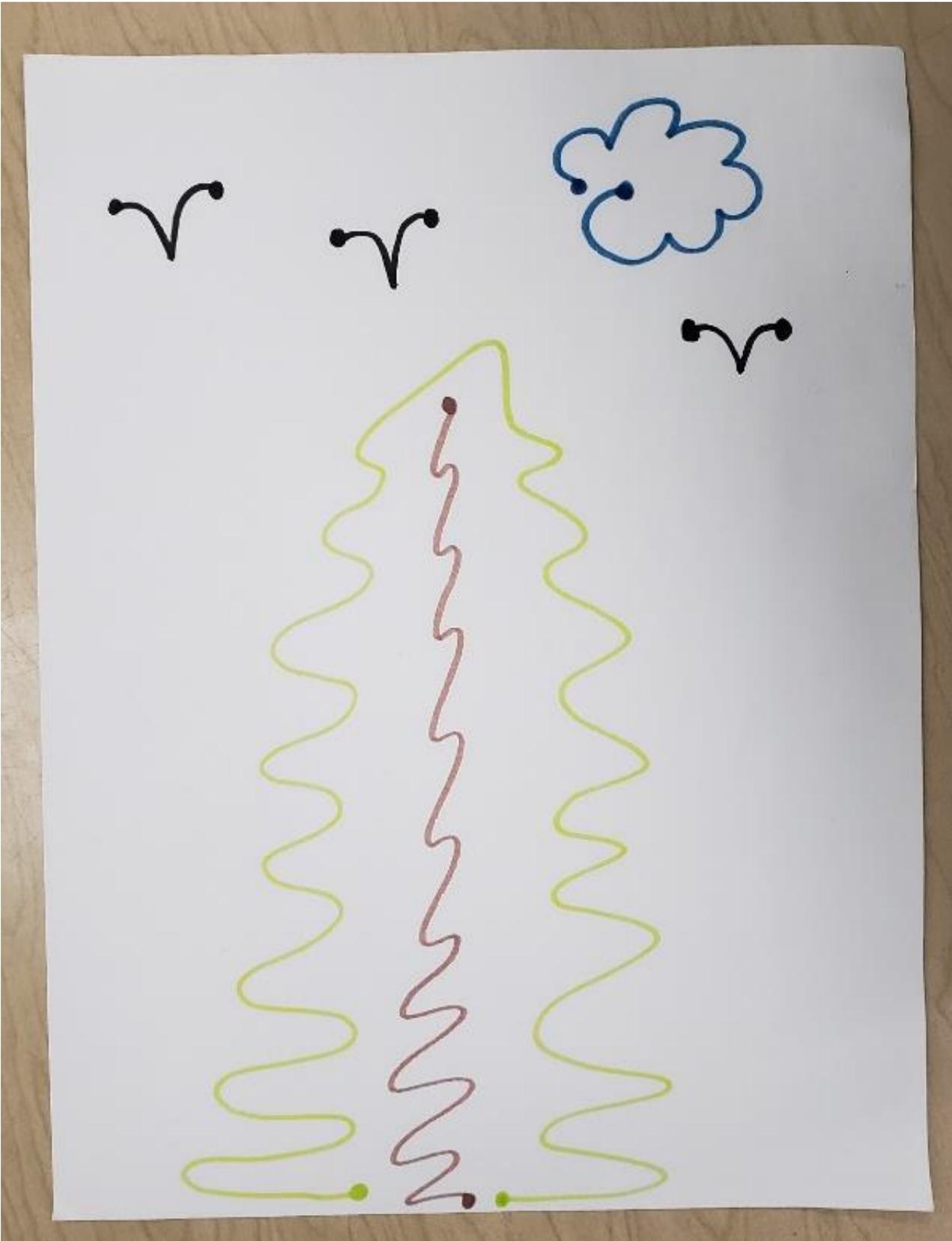
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Finger Maze #2



MNRI ACTIVITIES IN THE CLASSROOM

Finger Maze #3



MNRI ACTIVITIES IN THE CLASSROOM

Appendix J

Raw Data Week One Results

Week One (01/11-01/15/2021)

Morning

Monday			Tuesday			Thursday			Friday		
Person	On Task	Off Task									
Initial	Pre 2 Post 2	Pre 4 Post 4	Initial	Pre 3 Post 5	Pre 3 Post 1	Initial	Pre 4 Post 2	Pre 2 Post 4	Initial	Pre 5 Post 5	Pre 1 Post 1
Middle	Pre 3 Post 2	Pre 3 Post 4	Middle	Pre 2 Post 5	Pre 4 Post 1	Middle	Pre 4 Post 0	Pre 2 Post 6	Middle	Pre 4 Post 2	Pre 2 Post 4
End	Pre 3 Post 2	Pre 3 Post 4	End	Pre 3 Post 5	Pre 3 Post 1	End	Pre 3 Post 1	Pre 3 Post 5	End	Pre 1 Post 2	Pre 5 Post 4

Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6

Afternoon

Monday			Tuesday			Thursday			Friday		
	On Task	Off Task		On Task	Off Task		On Task	Off Task	11:38-40	On Task	Off Task
Initial	Pre 2 Post 2	Pre 4 Post 4	Initial	Pre 3 Post 5	Pre 3 Post 1	Initial	Pre 3 Post 3	Pre 3 Post 3	Initial	Pre 2 Post 1	Pre 4 Post 5
Middle	Pre 2 Post 2	Pre 4 Post 4	Middle	Pre 4 Post 5	Pre 2 Post 1	Middle	Pre 4 Post 3	Pre 2 Post 3	Middle	Pre 3 Post 2	Pre 3 Post 4
End	Pre 2 Post 2	Pre 4 Post 4	End	Pre 3 Post 5	Pre 3 Post 1	End	Pre 4 Post 3	Pre 2 Post 3	End	Pre 2 Post 2	Pre 4 Post 4

Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6

Thumbs Up			Middle			Thumbs Down		
M- 3 (2, 3, 5)	T- 4 (1, 2, 3, 5)	Th- 2 (5, 6)	M- 2 (4, 6)	T-	Th- 4 (1, 2, 3, 4)	M- 1 (1)	T- (4,6)	Th- F-
F- 4 (1, 3, 5, 6)			F- 2 (2, 4)					

Side Notes: 11/15 (F) Students were not very receptive to whole group activity. They thought it was "weird." First day of Intervention (F).

MNRI ACTIVITIES IN THE CLASSROOM

Raw Data Week Two Results

Week Two (01/18-01/22/2021)											
Morning											
Monday			Tuesday			Thursday			Friday		
Person E: 11:09-11	On Task	Off Task	Person I: 10:04-06	On Task	Off Task	Person I: 11:05-07	On Task	Off Task	Person E: 11:18-20	On Task	Off Task
Initial	Pre 4 Post 2	Pre 2 Post 4	Initial	Pre 3 Post 3	Pre 2 Post 2	Initial	Pre 3 Post 4	Pre 2 Post 1	Initial	Pre 4 Post 4	Pre 0 Post 0
Middle	Pre 4 Post 2	Pre 2 Post 4	Middle	Pre 3 Post 4	Pre 2 Post 1	Middle	Pre 3 Post 4	Pre 2 Post 1	Middle	Pre 4 Post 4	Pre 0 Post 0
End	Pre 1 Post 1	Pre 5 Post 5	End	Pre 3 Post 4	Pre 2 Post 1	End	Pre 3 Post 4	Pre 2 Post 1	End	Pre 1 Post 4	Pre 3 Post 0
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Afternoon											
Monday			Tuesday			Thursday			Friday		
I: 2:00-03	On Task	Off Task	I: 1:33-36	On Task	Off Task	I: 2:00-03	On Task	Off Task	I: 1:50-53	On Task	Off Task
Initial	Pre 2 Post 3	Pre 4 Post 3	Initial	Pre 4 Post 4	Pre 2 Post 2	Initial	Pre 2 Post 1	Pre 3 Post 4	Initial	Pre 3 Post 3	Pre 1 Post 1
Middle	Pre 4 Post 2	Pre 2 Post 4	Middle	Pre 2 Post 4	Pre 4 Post 2	Middle	Pre 2 Post 3	Pre 3 Post 2	Middle	Pre 3 Post 4	Pre 1 Post 0
End	Pre 1 Post 1	Pre 5 Post 5	End	Pre 3 Post 1	Pre 3 Post 5	End	Pre 4 Post 4	Pre 1 Post 1	End	Pre 3 Post 4	Pre 1 Post 0
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Thumbs Up				Middle				Thumbs Down			
M- 1 (1) T- 2 (1,5) Th- 2 (3,5) F- 2 (2, 5)				M- 5 (2, 3, 4, 5, 6) T- 3 (2, 3, 4) Th- 2 (1, 4) F- 2 (3, 4)				M- T- 1 (6) Th- 1 (2) F-			
Side Note:											

MNRI ACTIVITIES IN THE CLASSROOM

Raw Data Week Three Results

Week Three (01/25-01/29/2021)											
Morning											
Monday			Tuesday			Thursday			Friday		
Person I: 11:00-02	On Task	Off Task	Person I: 9:19-21	On Task	Off Task	Person I: 11:00-02	On Task	Off Task	Person I: 11:01-03	On Task	Off Task
Initial	Pre 5 Post 3	Pre 0 Post 2	Initial	Pre 3 Post 5	Pre 2 Post 0	Initial	Pre 5 Post 3	Pre 0 Post 2	Initial	Pre 5 Post 5	Pre 0 Post 0
Middle	Pre 3 Post 4	Pre 2 Post 1	Middle	Pre 3 Post 3	Pre 2 Post 2	Middle	Pre 4 Post 5	Pre 1 Post 0	Middle	Pre 5 Post 5	Pre 0 Post 0
End	Pre 3 Post 4	Pre 2 Post 1	End	Pre 4 Post 4	Pre 1 Post 1	End	Pre 5 Post 5	Pre 0 Post 0	End	Pre 4 Post 5	Pre 1 Post 0
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Afternoon											
Monday			Tuesday			Thursday			Friday		
I: 2:11-14	On Task	Off Task	I: 12:56-59	On Task	Off Task	I: 1:23- 26	On Task	Off Task	I: 1:05-08	On Task	Off Task
Initial	Pre 3 Post 3	Pre 2 Post 2	Initial	Pre 5 Post 5	Pre 0 Post 0	Initial	Pre 3 Post 3	Pre 2 Post 2	Initial	Pre 5 Post 5	Pre 0 Post 0
Middle	Pre 3 Post 3	Pre 2 Post 2	Middle	Pre 4 Post 3	Pre 1 Post 2	Middle	Pre 3 Post 5	Pre 2 Post 0	Middle	Pre 4 Post 5	Pre 1 Post 0
End	Pre 2 Post 5	Pre 3 Post 0	End	Pre 4 Post 5	Pre 1 Post 0	End	Pre 1 Post 5	Pre 4 Post 0	End	Pre 4 Post 5	Pre 1 Post 0
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Thumbs Up				Middle				Thumbs Down			
M-3 (2, 5, 6) T- 2 (5, 6) Th-2 (5, 6)			M-2 (1,3) T- 3 (1, 2, 3) Th- 2 (2, 3)			M- T- Th- 1 (1) F-			F-3 (1, 5, 6)		

MNRI ACTIVITIES IN THE CLASSROOM

Raw Data Week Four Results

Week Four (2/01-02/05/2021)

Morning

Monday

Tuesday

Thursday

Friday

Person E: 11:11-13	On Task	Off Task	Person E: 10:09-11	On Task	Off Task	Person E: 11:06-08	On Task	Off Task	Person E: 11:00-02	On Task	Off Task
Initial	Pre 2 Post 4	Pre 3 Post 1	Initial	Pre 1 Post 3	Pre 4 Post 2	Initial	Pre 4 Post 2	Pre 1 Post 3	Initial	Pre 3 Post 6	Pre 3 Post 0
Middle	Pre 4 Post 4	Pre 1 Post 1	Middle	Pre 1 Post 5	Pre 4 Post 0	Middle	Pre 4 Post 3	Pre 1 Post 2	Middle	Pre 5 Post 6	Pre 1 Post 0
End	Pre 3 Post 4	Pre 2 Post 1	End	Pre 1 Post 5	Pre 4 Post 0	End	Pre 3 Post 1	Pre 2 Post 4	End	Pre 6 Post 6	Pre 0 Post 0

Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6

Afternoon

Monday

Tuesday

Thursday

Friday

I: 1:44-47	On Task	Off Task	I: 1:44-47	On Task	Off Task	I: 1:15-18	On Task	Off Task	I: 11:11-14	On Task	Off Task
Initial	Pre 5 Post 5	Pre 0 Post 0	Initial	Pre 4 Post 3	Pre 1 Post 2	Initial	Pre 3 Post 5	Pre 2 Post 0	Initial	Pre 3 Post 5	Pre 3 Post 1
Middle	Pre 5 Post 5	Pre 0 Post 0	Middle	Pre 4 Post 4	Pre 1 Post 1	Middle	Pre 3 Post 5	Pre 2 Post 0	Middle	Pre 0 Post 5	Pre 6 Post 1
End	Pre 5 Post 5	Pre 0 Post 0	End	Pre 3 Post 3	Pre 2 Post 2	End	Pre 3 Post 4	Pre 2 Post 1	End	Pre 0 Post 5	Pre 6 Post 1

Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6 Present: Student 1 2 3 4 5 6

Thumbs Up			Middle			Thumbs Down			
M- 3 (2, 3, 5)	T- 4 (1, 2, 3, 5)	Th- 2 (1, 3)	M- 2 (1, 6)	T- 1 (6)	Th- 3 (2, 5, 6)	M-	T-	Th-	F-
F- 2 (1, 6)			F- 4 (2, 3, 4, 5)						

MNRI ACTIVITIES IN THE CLASSROOM

Raw Data Week Five Results

Week Five (02/08-02/12/2021)											
Morning											
Monday			Tuesday			Thursday			Friday		
Person E: 11:01-04	On Task	Off Task	Person I: 9:51- 54	On Task	Off Task	Person I: 11:19-21	On Task	Off Task	Person I: 10:56-58	On Task	Off Task
Initial	Pre 3 Post 5	Pre 3 Post 1	Initial	Pre 1 Post 5	Pre 5 Post 1	Initial	Pre 4 Post 6	Pre 2 Post 0	Initial	Pre 2 Post 4	Pre 4 Post 2
Middle	Pre 4 Post 4	Pre 2 Post 2	Middle	Pre 1 Post 3	Pre 5 Post 3	Middle	Pre 5 Post 5	Pre 1 Post 1	Middle	Pre 2 Post 4	Pre 4 Post 2
End	Pre 4 Post 4	Pre 2 Post 2	End	Pre 1 Post 3	Pre 5 Post 3	End	Pre 5 Post 6	Pre 1 Post 0	End	Pre 2 Post 4	Pre 4 Post 2
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Afternoon											
Monday			Tuesday			Thursday			Friday		
I: 12:48-50	On Task	Off Task	I: 1:42-45	On Task	Off Task	I: 2:13-16	On Task	Off Task	I: 1:41-44	On Task	Off Task
Initial	Pre 3 Post 4	Pre 3 Post 2	Initial	Pre 4 Post 5	Pre 2 Post 1	Initial	Pre 4 Post 5	Pre 2 Post 1	Initial	Pre 2 Post 3	Pre 4 Post 3
Middle	Pre 2 Post 3	Pre 4 Post 3	Middle	Pre 4 Post 5	Pre 2 Post 1	Middle	Pre 4 Post 5	Pre 2 Post 1	Middle	Pre 2 Post 4	Pre 4 Post 2
End	Pre 2 Post 2	Pre 4 Post 4	End	Pre 5 Post 6	Pre 1 Post 0	End	Pre 4 Post 5	Pre 2 Post 1	End	Pre 2 Post 4	Pre 4 Post 2
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Thumbs Up			Middle			Thumbs Down					
M- 2 (1, 5) T- 3 (1, 2, 6) Th- 1 (1)			M- 4 (2, 3, 4, 6) Th- (2, 3, 4, 5, 6)			T- 3 (3, 4, 5) F- 2 (4, 5)					

MNRI ACTIVITIES IN THE CLASSROOM

Raw Data Week Six Results

Week Six (02/15-02/19/2021)											
Morning											
Monday			Tuesday			Thursday			Friday		
Person I: NO SCH	On Task	Off Task	Person I: 11:07-09	On Task	Off Task	Person I: 11:07-09	On Task	Off Task	Person I: 11:11-13	On Task	Off Task
Initial	Pre Post	Pre Post	Initial	Pre 1 Post 3	Pre 5 Post 3	Initial	Pre 4 Post 5	Pre 2 Post 1	Initial	Pre 6 Post 6	Pre 0 Post 0
Middle	Pre Post	Pre Post	Middle	Pre 0 Post 2	Pre 6 Post 4	Middle	Pre 3 Post 5	Pre 3 Post 1	Middle	Pre 6 Post 6	Pre 0 Post 0
End	Pre Post	Pre Post	End	Pre 0 Post 3	Pre 6 Post 3	End	Pre 3 Post 5	Pre 3 Post 1	End	Pre 6 Post 6	Pre 0 Post 0
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Afternoon											
Monday			Tuesday			Thursday			Friday		
I:	On Task	Off Task	I:1:41-44	On Task	Off Task	I:1:35-38	On Task	Off Task	I: 1:06-:09	On Task	Off Task
Initial	Pre Post	Pre Post	Initial	Pre 2 Post 2	Pre 4 Post 4	Initial	Pre 2 Post 5	Pre 4 Post 1	Initial	Pre 6 Post 6	Pre 0 Post 0
Middle	Pre Post	Pre Post	Middle	Pre 0 Post 5	Pre 6 Post 1	Middle	Pre 2 Post 4	Pre 4 Post 2	Middle	Pre 6 Post 6	Pre 0 Post 0
End	Pre Post	Pre Post	End	Pre 1 Post 5	Pre 5 Post 1	End	Pre 3 Post 6	Pre 3 Post 0	End	Pre 6 Post 6	Pre 0 Post 0
Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6			Present: Student 1 2 3 4 5 6		
Thumbs Up				Middle				Thumbs Down			
M- T- 4 (1, 3, 5, 6) Th- 3 (1, 5, 6) F- 2 (1, 5)				M- T- 2 (2, 4) F- 4 (2, 3, 4, 6) Th- 3(2, 3, 4)				M- T- Th- F-			

Running Head: MNRI ACTIVITIES IN THE CLASSROOM

Appendix K

Teacher's Descriptors (Teacher Observations)

	11-Jan	12-Jan	14-Jan	15-Jan	18-Jan	19-Jan	21-Jan	22-Jan	25-Jan	26-Jan	28-Jan	29-Jan	1-Feb	2-Feb	4-Feb	5-Feb	8-Feb	9-Feb	11-Feb	12-Feb	15-Feb	16-Feb	18-Feb	19-Feb
Student 1	Off	Off	Off	Off	On/Off	Off	On	ABSENT	Off	On	On	On	On	Off	On	Off	Off	On	On	Off	NO SCHOOL	On/Off	On	On
Student 2	Off	Off	Off	Off	Off	On/Off	Off	On	On/Off	Off	On	On	On	Off	Off	On	Off	On	On/Off	Off	NO SCHOOL	Off	Off	On
Student 3	On	On	On	On	On	On	NO SCHOOL	On	On	On														
Student 4	Off	Off	On	Off	On/Off	On	Off	On	ABSENT	On	On	Off	On	Off	NO SCHOOL	Off	On	On						
Student 5	On	On	Off	Off	On/Off	On	On	On/Off	On	On	On	NO SCHOOL	Off	On	On									
Student 6	Off	Off	On	Off	Off	Off	ABSENT	ABSENT	On	On	On	On	On	On	Off	On	On/Off	On	On/Off	On/Off	NO SCHOOL	Off	Off	On

Student Perceptions (End of the Day Student Results)

	11-Jan	12-Jan	14-Jan	15-Jan	18-Jan	19-Jan	21-Jan	22-Jan	25-Jan	26-Jan	28-Jan	29-Jan	1-Feb	2-Feb	4-Feb	5-Feb	8-Feb	9-Feb	11-Feb	12-Feb	15-Feb	16-Feb	18-Feb	19-Feb
Student 1	Down	Up	Middle	Up	Up	Up	Middle	ABSENT	Middle	Middle	Down	Up	Middle	Up	Up	Up	Up							
Student 2	Up	Up	Middle	Middle	Middle	Middle	Down	Up	Up	Middle	Middle	Middle	Up	Up	Middle	Middle	Middle	Up	Middle	Up	NO SCHOOL	Middle	Middle	Middle
Student 3	Up	Up	Middle	Up	Middle	Middle	Up	Middle	Middle	Middle	Middle	Middle	Up	Up	Up	Middle	Middle	Middle	Middle	Up	NO SCHOOL	Up	Middle	Middle
Student 4	Middle	Down	Middle	Middle	Middle	Middle	Middle	Middle	ABSENT	Middle	Middle	Middle	Middle	Middle	NO SCHOOL	Middle	Middle	Middle						
Student 5	Up	Up	Up	Up	Middle	Up	Middle	Middle	Up	Middle	Middle	Middle	NO SCHOOL	Up	Up	Middle								
Student 6	Middle	Down	Up	Up	Middle	Down	ABSENT	ABSENT	Up	Up	Up	Up	Middle	Middle	Middle	Up	Middle	Up	Middle	Up	NO SCHOOL	Up	Up	Up

Appendix L

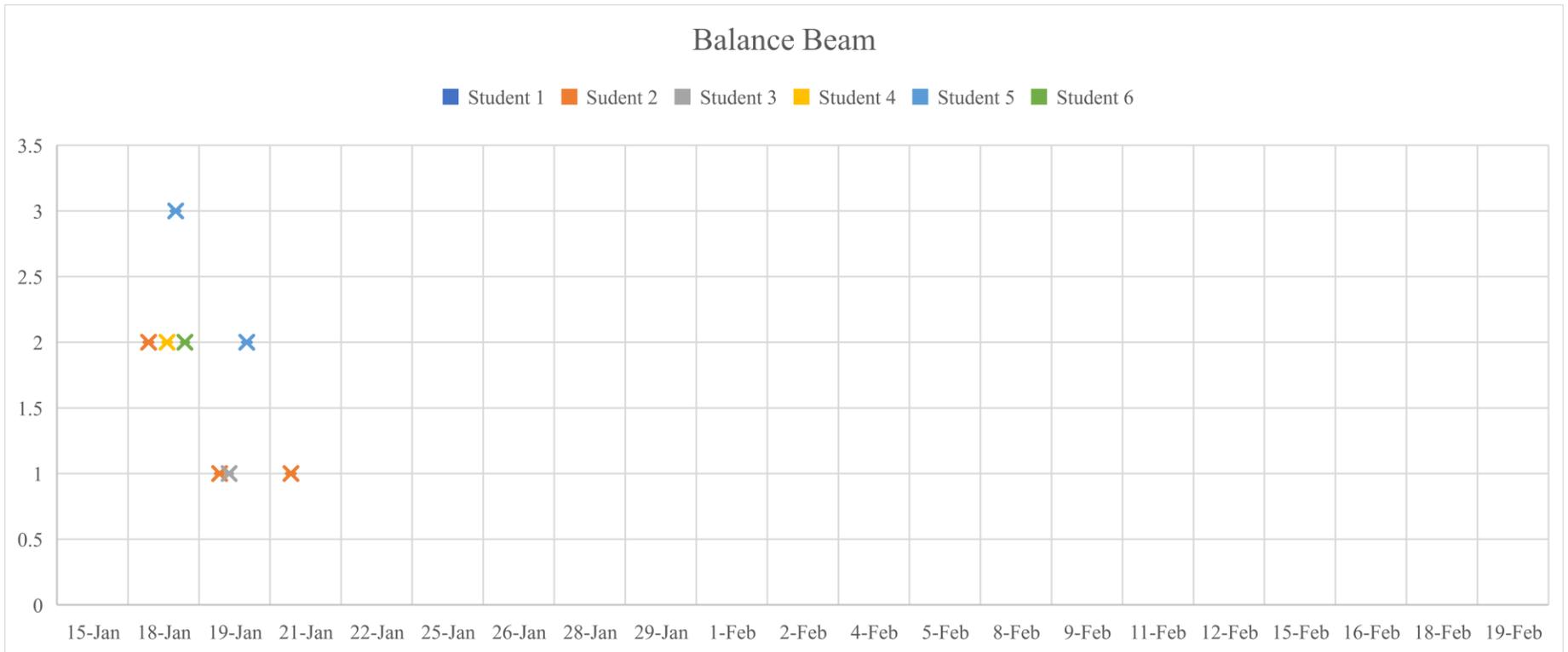
Student Perceptions Percentages

Student	Percentage for Thumbs Up	Percentage for Thumbs Middle	Percentage for Thumbs Down	Number of Responses Aligned with Teacher Observations	Number of Responses Not Aligned with Teacher Observations
Student 1	68.2%	22.7%	9.1%	7 (31.8%)	15 (68.2%)
Student 2	34.8%	60.9%	4.3%	6 (26.1%)	17 (73.9%)
Student 3	39.1%	60.9%	0%	9 (39.1%)	14 (60.9%)
Student 4	0%	93.8%	6.2%	1 (6.3%)	15 (93.7%)
Student 5	69.6%	30.4%	0%	13 (56.5%)	10 (43.5%)
Student 6	57.1%	33.3%	9.5%	12 (57.1%)	9 (42.9%)

MNRI ACTIVITIES IN THE CLASSROOM

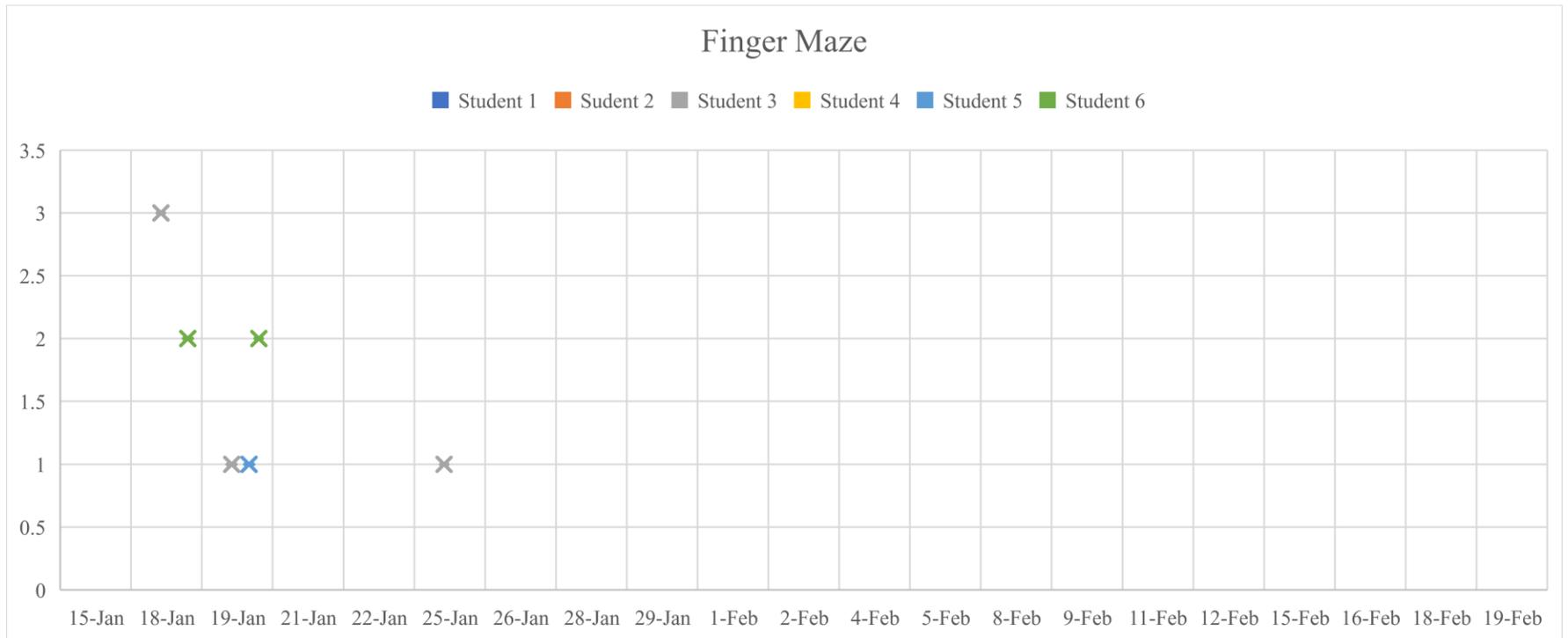
Appendix M

Balance Beam Frequency Results



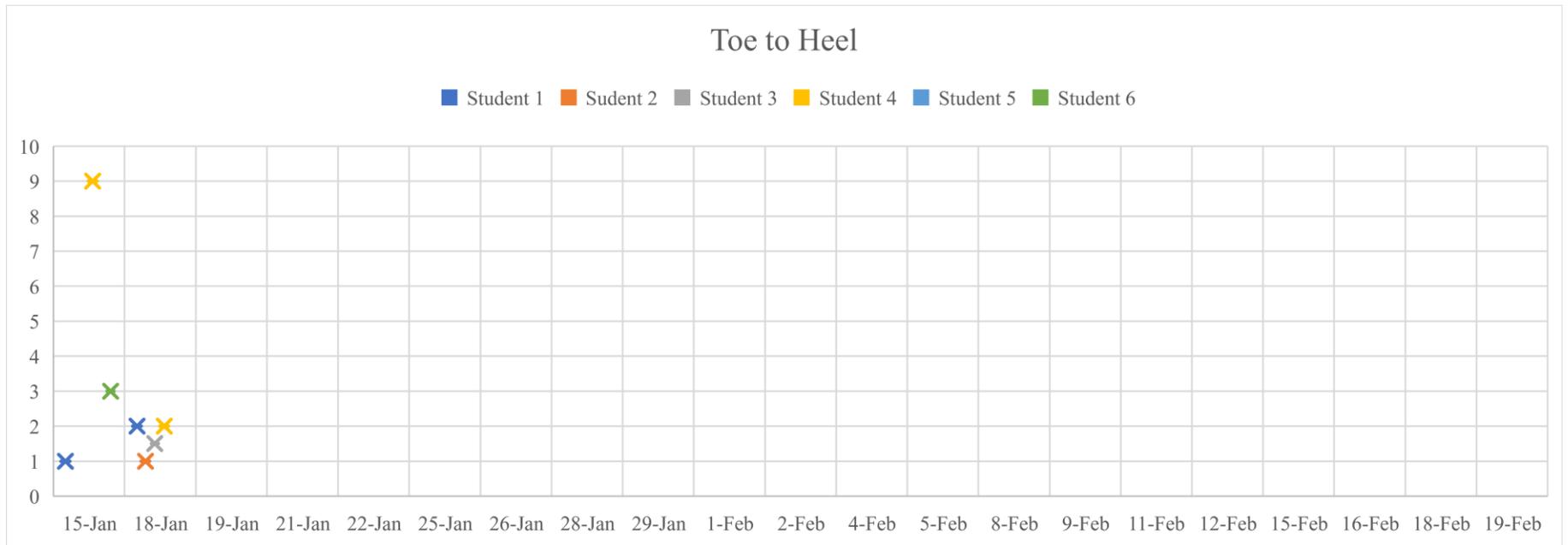
MNRI ACTIVITIES IN THE CLASSROOM

Finger Maze Frequency Results



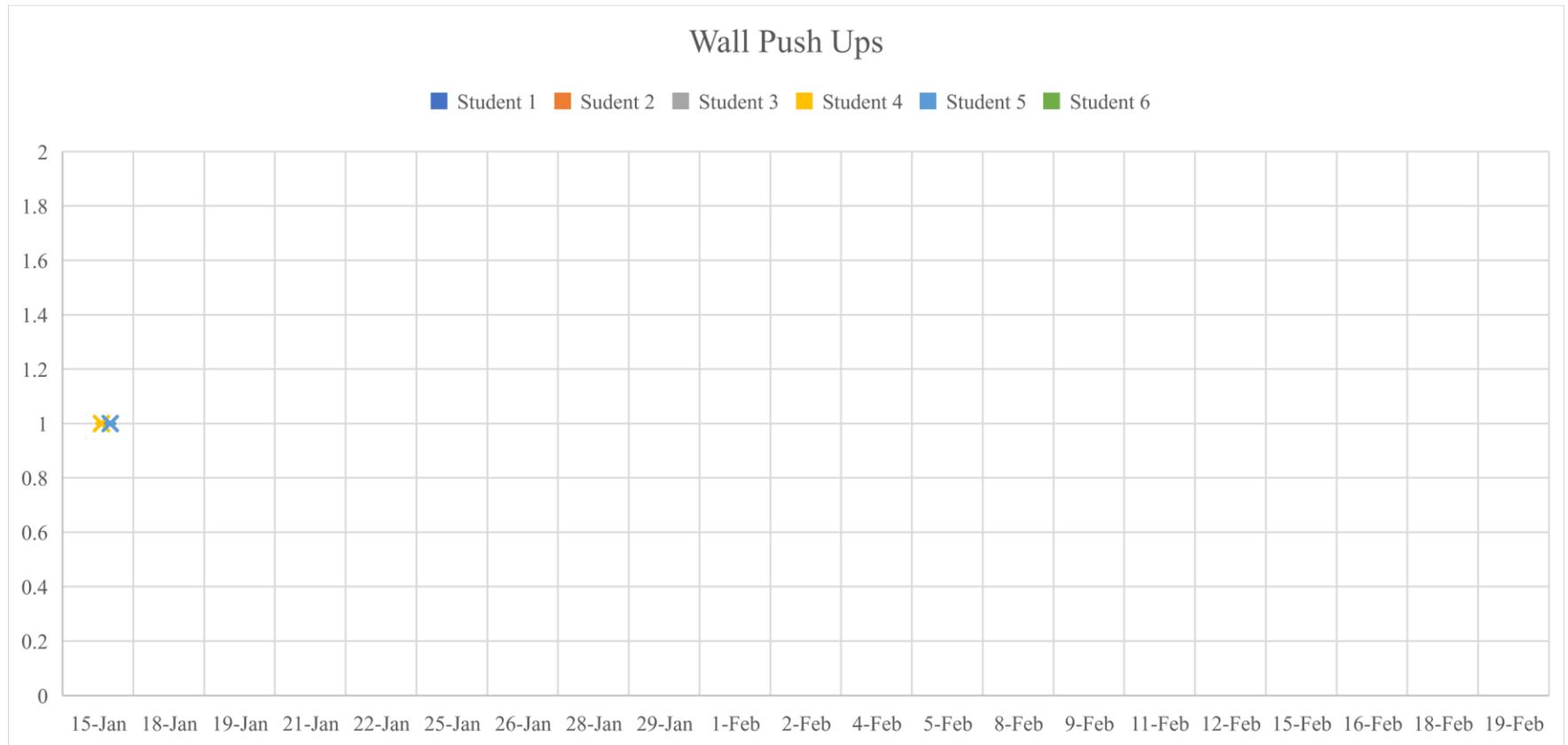
MNRI ACTIVITIES IN THE CLASSROOM

Toe-to-Heel Frequency Results



MNRI ACTIVITIES IN THE CLASSROOM

Wall Push-Ups Frequency Results



MNRI ACTIVITIES IN THE CLASSROOM

Appendix N

Percentages for On and Off-task Behaviors Between Pre- and Post-Observation

Week		Monday's On and Off-task Behavior Percentages	Tuesday's On and Off-task Behavior Percentages	Thursday's On and Off-task Behavior Percentages	Friday's On and Off-task Behavior Percentages
1	Morning	On-Task: 25% Decrease Off-Task: 20% Increase	On-Task: 46.7% Increase Off-Task: 70% Decrease	On-Task: 72.7% Decrease Off-Task: 114.3% Increase	On-Task: 20% Decrease Off-Task: 25% Increase
	Afternoon	On-Task: 0% Change Off-Task: 0% Change	On-Task: 50% Increase Off-Task: 62.5% Decrease	On-Task: 18.2% Decrease Off-Task: 28.6% Increase	On-Task: 28.6% Decrease Off-Task: 18.2% Increase
2	Morning	On-Task: 44.4% Decrease Off-Task: 44.4% Increase	On-Task: 22.2% Increase Off-Task: 22.2% Decrease	On-Task: 33.3% Increase Off-Task: 50% Decrease	On-Task: 33.3% Increase Off-Task: 100% Decrease
	Afternoon	On-Task: 14.3% Decrease Off-Task: 44.4% Increase	On-Task: 0% Change Off-Task: 0% Change	On-Task: 0% Change Off-Task: 0% Change	On-Task: 22.2% Increase Off-Task: 66.7% Decrease
3	Morning	On-Task: 0% Change Off-Task: 0% Change	On-Task: 20% Increase Off-Task: 40% Decrease	On-Task: 7.1% Decrease Off-Task: 100% Increase	On-Task: 7.1% Increase Off-Task: 100% Decrease
	Afternoon	On-Task: 37.5% Increase Off-Task: 42.9% Decrease	On-Task: 0% Change Off-Task: 0% Change	On-Task: 85.7% Increase Off-Task: 75% Decrease	On-Task: 15.4% Increase Off-Task: 100% Decrease
4	Morning	On-Task: 33.3% Increase Off-Task: 50% Decrease	On-Task: 333.3% Increase Off-Task: 83.3% Decrease	On-Task: 45.5% Decrease Off-Task: 125% Increase	On-Task: 28.6% Increase Off-Task: 100% Decrease
	Afternoon	On-Task: 0% Change Off-Task: 0% Change	On-Task: 9.1% Decrease Off-Task: 25% Increase	On-Task: 55.6% Increase Off-Task: 83.3% Decrease	On-Task: 400% Increase Off-Task: 80% Decrease
5	Morning	On-Task: 18.2% Increase Off-Task: 28.6% Decrease	On-Task: 266.7% Increase Off-Task: 53.3% Decrease	On-Task: 21.4% Increase Off-Task: 75% Decrease	On-Task: 100% Increase Off-Task: 50% Decrease
	Afternoon	On-Task: 28.6% Increase Off-Task: 18.2% Decrease	On-Task: 23.1% Increase Off-Task: 60% Decrease	On-Task: 25% Increase Off-Task: 50% Decrease	On-Task: 83.3% Increase Off-Task: 41.7% Decrease
6	Morning	NO SCHOOL	On-Task: 700% Increase Off-Task: 41.2% Decrease	On-Task: 50% Increase Off-Task: 62.5% Decrease	On-Task: 0% Change Off-Task: 0% Change
	Afternoon	NO SCHOOL	On-Task: 300% Increase Off-Task: 60% Decrease	On-Task: 114.3% Increase Off-Task: 72.7% Decrease	On-Task: 0% Change Off-Task: 0% Change

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