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The Effect of Purposeful Movement in the Garden On Attention and Focus in the Primary
Montessori Classroom

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in fulfillment of final requirements for the MAED degree

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Advisor _____ Date _____

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Abstract

This study explores how gardening affects students' focus and attention in a primary Montessori classroom. Over the course of a four-week intervention, the teacher-researcher provided eleven students with mini-gardening lessons, followed by time to use purposeful movement in the garden. When students returned to the classroom to assume their Montessori work activities, the researcher collected data by recording the time it took the students to get on task, whether or not students were focused, and which unfocused behaviors were exhibited. A pre-and post-attitude scale was completed by the students to determine prior experiences and attitudes towards gardening. The study revealed that during the intervention, time to get on task decreased and ability to focus increased. Students who were habitually inattentive and not focused continued this pattern, but did show improvement over the life of the study. Further research is needed to support these findings; post-intervention data could be collected to determine long-term impacts, and a higher number of students should be involved in the intervention for generalization purposes.

Keywords: Attention, Focus, Montessori, Nature Deficit, School Gardening, Movement

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In today's public Montessori classrooms, students come from a wide variety of backgrounds and bring a full range of abilities to the classroom with them. In a perfect world, they will enter a carefully prepared Montessori environment and become a part of this peaceful environment where they experience a unique learning experience catered to their individual needs to reach their full potential. In reality, however, I observe students who enter school and experience limited success because they are unable to concentrate and take their work seriously. These students struggle to begin work, fail to finish work they start, and need frequent redirection from the teacher. Their lack of focus, in turn, disturbs other students and limits all students' progress. There is a growing volume of research that points to a generation of children who spend more and more time indoors and in front of some kind of technology including televisions, gaming systems, and tablets with little or no purposeful movement. However, there is also research that points to strategies that can help these students to become successful in school and in life.

My K-8 Title 1 public elementary-middle school is situated in a small rural town. I teach a multi-age early childhood Montessori class with 11 four-year olds and 10 five-year olds. Seventy-six percent are on free or reduced lunch. The racial mix is 70% Caucasian and 30% African American. Families within the school come from generational poverty, as well as, single parent homes, and parents who work an hour or more away from home. There are many families where the children are taken care of by elderly grandparents and older siblings. Whether these factors contribute or not, my school has noticed a staggering increase in students who struggle to settle into work and focus on tasks, even when immersed in the science and beauty of a prepared Montessori environment. Students begin a work and put it away before completion. Students are

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easily distracted by noise and movement of other students leading to more noise and distractions. Students have to frequently be redirected.

In a Montessori classroom, the teacher carefully prepares the classroom shelves for students to self-select their work (lessons) for the day. Activities are sequential and as a student masters one activity, the next lesson in the learning sequence is already on the shelf waiting for them. Without the ability to attend and focus on their individual work, students cannot move forward with more challenging works. The goal of this study is to see students exhibiting genuine focus and concentration and increasing their time on task. Purposeful movement is not only critical to physical growth but also has a positive impact on a child's ability to attend and focus (Lillard, A., 2005). In this study, gardening lessons were designed to give students the opportunity to use the purposeful movement of preparing and planting a garden to see if this experience would foster more focus and concentration in the classroom. Based on a base-line attitude survey, lessons were designed and delivered to students over eighteen days. During that time, observations and documentation of student work were collected. I sought to gain understanding to the question: what effect will the purposeful movement in the garden have on attention and focus in the Primary Montessori Classroom?

Literature Review

Identifying Roots of Student Inattention

The literature presents numerous reasons why children struggle with attention and focus in the classroom. Most of their difficulties are rooted in either biological or environmental factors, although new research is beginning to draw parallels between the two.

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Biological Factors

Attention deficit hyperactivity disorder (ADHD) is a common brain condition that creates many barriers for young learners, including impulsivity; inability to self-calm; inattentiveness; and disorganization (Peck, 2005). The Center for Disease Control and Prevention (CDC) estimates 11% of children ages 4-17 have a diagnosis of ADHD; since 2003, the number of diagnosed children ages 2-5 has increased to 237,000, a staggering 50% increase (Centers for Disease Control and Prevention, 2017). Catherine Massie reflects that this change is due to a combination of better diagnosing techniques, heightened awareness, and the high heritability of ADHD (2017). Several scholars also explore the idea that a progressively technological culture, one that overlooks physical movement, could contribute to the increase in diagnoses (Hannaford, 2005; Massie, 2017).

Carla Hannaford proposes that all brain functions are connected to the rest of our body, and by separating the two, learning naturally becomes more difficult (2005). Due to a trend towards reduced self-selected movement in classrooms and increased rote learning, students' neural pathways may have changed, resulting in the lack of attention and focus (Hannaford, 2005). However, neural pathways are flexible and can be altered through intentional, integrated movement, allowing our brains to "require less energy and function more efficiently" (Hannaford, 2005, p. 113). Through this lens, many of the biological roots for student inattention could - perhaps - change over time through a renewed focus on adverse environmental factors.

Environmental Factors

Jones and Cossentino (2017) note childrens' problems are more related to "capacity rather than choice or motivation," and this capacity becomes greatly reduced when movement is

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not intuitively integrated into the learning experience (p. 257). Therefore, rather than placing the onus on a child for his or her inattentiveness, educators must ask themselves what environmental factors are impeding their students' progress, including both home and school settings (Jones & Cossentino, 2017; Frierson 2016).

Screen Time. Several studies and books have pointed to a correlation between excessive screen time and attention deficits (Kutscher, 2015; Louv, 2010). In a survey conducted by Kutscher and Rosin (2015), 90% of teachers “felt technology has created a distracted generation with short attention spans” (p. 24). Moving beyond simply measuring perceptions, Christakis (2004) concludes there is a positive correlation between early screen usage and attention issues at age 7. His primary question was how many hours per day their child watched television, and “the magnitude of the risk associated with television viewing [became] clinically significant” (Christakis, 2004, p. 710).

Organization. In her book *Montessori: the Science behind the Genius*, Angeline S. Lillard discusses several factors related to attention and focus issues. She found that when homes were not organized it led to poorer cognitive function and more difficult temperaments (2007). Crowded households have also been shown to have a negative impact on student cognition. Lillard addressed spatial order stating that children craved order and without it, memory capacities were limited; in addition, children from noise-rich homes had lower cognitive scores (2007). Children learn to “shut out the noise” and in turn, might shut out important stimuli related to attention (Lillard, 2007).

Connection with nature. Richard Louv hypothesizes that increased screen time in conjunction with decreased time outdoors creates a “nature-deficit disorder” which exacerbates

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the symptoms of ADHD (2010). He states “the detachment of education from the physical world not only coincided with the dramatic rise in life threatening obesity but also with a growing body of evidence that links physical exercise and experience in nature to mental acuity and concentration” (2010, p. 99). This suggests that there may be a correlation between time spent outdoors in nature and the ability to pay attention and concentrate.

In a separate study, parents of children with ADHD were surveyed to see if there was a relationship between nature exposure in multiple settings and their child’s attentional functioning (Taylor, 2001). It was found that time in nature may support a child’s ability to focus and pay attention. The researchers felt children who suffer from attentional issues may benefit from daily exposure to green spaces. They also stated that these findings may help *all* children, not just ones with obvious focus issues .

Potential Solutions to Children’s Struggle to Focus

Dr. Maria Montessori once said, “When you have solved the problem of controlling the attention of the child you have solved the entire problem of its education.” (The California Lectures of Maria Montessori, 1997, p. 338). According to the literature, the key strategies currently used to control this attention are collaborative behavior plans; technology; cross-age tutoring; and movement integration.

Collaborative Behavior Plans. Barbara Luborsky links the role of the teacher with that of the occupational therapist and the physician (Luborsky, 2017). When the teacher has a child struggling with attentional issues, multiple scholars suggest that a collaboration between the above three mentioned persons can be effective in addressing the issue (Luborsky, 2017; Massie, 2017). The occupational therapist, for example, can help the teacher when selecting “sensory and

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motor-enhanced activities in supporting the development of the child” (Luborsky, 2017, p. 288).

The theory of multiple intelligences, as proposed by Howard Gardner, connects to this collaboration. The premise is the teacher furnishes learning activities that touch on the eight intelligences: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalist (Armstrong, 1999). By collaborating with each other and with the student, an effective educational team can discover the pathways for student success. Luborsky notes that some children have more in-depth needs that can require individualized education plans and consultation with physicians to meet the needs of the child (2017).

Technology. Too much computer time has been shown to have a negative impact on students ability to focus and concentrate, as mentioned above. According to some researchers, however, the high-speed stimuli may be a perfect learning tool for the child with attention and focus issues. Benefits can include instant feedback, ability to control stimuli, bright colors and sounds, and personal interaction (Armstrong, 1999).

Peer and Cross-age Tutoring. Another strategy to help students with attentional issues is to employ peer and cross-age tutoring. Used daily in Montessori classrooms everywhere, students pair up with other students for collaborative learning. The child that struggles to focus will become the responsible person in the relationship (Lillard, 2005). According to Maria Montessori, "There is nothing which makes you learn more than teaching someone else" (1997, p. 69). This method, in turn, generates focus to the task at hand.

Movement Integration. There is a mountain of research on the benefits of movement in the classroom for the child with attention issues. Paul Dennison founded a movement-based learning system called Brain Gym (Cohen & Goldsmith, 2002). It consists of a series of motions

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used to connect the body to the brain. These movements can be correlated to not only help the brain learn, but it can also have a calming effect on the stressed child with attention and focus issues (Cohen & Goldsmith, 2002). Yoga is another movement-based exercise that research indicates is an intervention for attention and concentration. Heather Peck and her colleagues found that yoga is a "promising alternative to behavioral and medical interventions... for children with attention problems" (Peck, p. 422). Furthermore, yoga aids in the reduction of anxiety, headaches, stress as well as having a positive impact on academic performance, and attitudes towards self.

Alicia Noddings notes that we must make time for "movement and nature" in our classrooms (2017). She lists environmental considerations for teachers to check for in their classrooms such as room layout, lighting and visual organization, a variety of activities, available seating options, active unstructured play, structured movement, "time in" place, care of personal needs, and sensory factors. She recommends the use of hand-size fidgets and squeeze balls of varying sizes, noise-canceling headphones, colored glasses, stretch/resistance bands, and chewing tools (2017). She advises that good communication between home and school with consistency in setting behavioral expectations is best for the child with attention issues.

The literature shows a connection between purposeful movement and a child's ability to focus and concentrate (Goerg, 2016; Leutgeb, 2017; McCabe, 2016). Children's behaviors were shown to have some improvement in terms of less distractibility and more focus on lessons with the addition of "walking the line" activities (Leutgeb, 2017) and the addition of a movement shelf with activities students could complete outside in the garden area (McCabe, 2016). Dr. Montessori believed "a child makes it obvious that the development of his mind comes about

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through his movements" (Montessori, 1995, p. 142). In the Practical Life area of the Montessori Primary classroom, students practice concentration through the real-life, thus meaningful, hands on activities. They pour, spoon, polish, scrub, sew, hammer, sweep, dust, etc.. It is through this repetitive purposeful practice that students achieve the ability to focus, attend, and concentrate in other areas of the classroom.

In conjunction with the research on purposeful movement, I found research pointing to the benefits of gardening in the classroom (Blair, 2009; Habib & Doherty, 2007; Hanscom, 2016; Louv, 2016). Outcomes included students feeling calm, safe, happy and relaxed, as well as improved academic performance and improvement in mood, attitude and ability to focus. The same kind of purposeful movement that is found in the Practical Life area of the classroom can also be found in the garden through hoeing, planting watering, mulching, and weeding.

The research on purposeful movement combined with the research on the benefits of classroom gardening, led to the purpose of this research: What effect does purposeful movement, in the form of structured physically-intensive gardening activities, have on attention and focus in the primary Montessori classroom?

Methodology

This study was conducted during the months of January and February and included eleven five and six year olds. A passive consent form was sent home to parents and the results were all parents agreed for their child to participate in this research (Appendix A).

Description of Data Tools

Attitude Scale. Prior to beginning the gardening experience, students completed an attitude scale to determine individual attitudes towards gardening and if they had any prior

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experiences in a garden (See Appendix B). Student attitudes and histories could impact the outcomes of the learning experience and behaviors in the classroom. The attitude scale was completed again at the end of the intervention.

Classroom Observation Pre-Intervention and During. Baseline data in the classroom was collected before the gardening intervention began (See Appendix C). The researcher observed students in the classroom and tallied how long it took students to begin work at the beginning of the work cycle; types of unfocused/off task behaviors; and if students were or were not completing activities. The same form was used during the study

Gardening Observation (outside). The researcher made behavioral observations on Observation Form (see Appendix D). These observations provided qualitative data about students' level of participation and clarified student attitude towards working in the garden. The researcher compared responses of students who did and did not enjoy gardening with their degree of focus in the classroom.

Field Journal Notes. The researcher completed daily field notes including the mood of the students, weather, absences, interruptions and conditions of the environment during the work cycle following each garden intervention (See Appendix E). The researcher used this data in order to paint a mental picture of what occurred in the classroom. This data helped inform anomalies in the researcher's data and documented unusual events that may have impacted outcomes in the classroom.

Description of Events

Baseline data was collected in the classroom for five days in December using the same observation form that was used during the implementation of the research (Appendix C). Using

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this form, the researcher recorded how long it took students to begin working. Working means they selected their work, set it up and worked with focus and concentration. As they completed their first work, the researcher made note of types of off-task behavior including being inappropriate with work, wandering around, bothering others, and daydreaming, as well as, focused/on-task behavior. The researcher made an adjustment to the Classroom Observation form while taking baseline data (See appendix C). While collecting baseline data, it was found that it was not the number of works completed as much as that they were steadily working and focused that was important. After the initial observation, the researcher proceeded with regular routine of observations, small group, and individual lessons. A second observation was made using a different color pencil using the same observation form about one hour into the work cycle to see if students were focused on their work or exhibiting distracted, inattentive behaviors.

The researcher began the gardening intervention in January to establish if the purposeful movement used in the garden would translate into more focused students in the classroom. The students completed an attitude survey to establish attitude towards gardening and prior experience (Appendix B). The students reported how they felt about working in the garden and if they thought they would like it. The added question "Have you ever worked in a garden before?" had an impact on answers to the other two questions, and therefore was important data to gather. The focus group was unable to get many sequential days during the month of January due to snow days, rain days, and several days where half the class was out sick with the flu. In spite of these obstacles, students were able to get into the garden with hands in the dirt nine days during January and nine days during February resulting in a total of eighteen days of data.

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Time in the Garden

The garden lessons as seen in Table 1 began each day at approximately 8:15 on the classroom patio. The entire intervention consisting of the mini lesson, time in the garden, and transition time lasted approximately twenty five minutes. .

Day 1 Garden Introduction Ground Rules	Day 2 Grace and Courtesy in the garden	Day 3 Use of garden tools & safety	Day 4 Review of grace and courtesy and tool safety	Day 5 Review of grace and courtesy and tool safety
Day 6 Lifecycle of a plant	Day 7 Weather and its effect on gardens	Day 8 Animals in the garden	Day 9 Weeds in the garden	Day 10 Beneficial Insects
Day 11 Student Questions and Review	Day 12 Student Questions and Review	Day 13 Student Questions and Review	Day 14 Student Questions and Review	Day 15 Student Questions and Review
Day 16 Planting and garden bed care	Day 17 Planting and garden bed care	Day 18 Planting and garden bed care		

Table.1. Mini-Lessons

After the short mini-lesson, the students would gather at the garden beds to begin the task of preparing the garden beds for planting. The garden beds were full of weeds, specifically crab grass, that all had to be removed before seeds could be planted. Students shared child-sized work gloves and took turns being in charge of the wagon as other students put weeds in it. The students used child-sized hoes and spades to dig weeds out of the garden. During the introduction of tools mini-lesson, students learned how to use the tools most effectively and how to use them

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safely. The students worked in the garden for 15 minutes while the researcher observed and documented if they were on or off task using Observation Form A (Appendix D). If students were on task, they were either pulling weeds or cleaning up the weeds by putting them in the wagon. Off task behavior included bothering others, walking around, and daydreaming. Notes of engagement, attitudes, general mood and behavioral issues were recorded. The daily weather was recorded on this form because the weather affected if the focus group went outside and for how long. Before returning to the classroom, the group gathered together back on the patio for the students to talk about any discoveries made and to talk about what they would do next time. The students returned to the classroom to wash hands and to begin their Montessori work cycle with the four year olds.

It took the students fifteen days to complete preparation of the garden beds. During the last three days of the intervention, students planted snow peas, bib lettuce, and potatoes. Students set up a trellis for the peas and marked the rows of seeds with plastic garden markers which they wrote the name and drew a picture of the plants the seeds would grow in to. The students covered the beds with a light layer of mulch to help warm the beds to aid in germination and to conserve water. Other vegetables would not be planted until later in March due to the chance of frost.

In the Classroom

The students used purposeful movement in the garden through the use of the gardening tools and their hands as they prepared the garden beds and planted seeds. Purposeful movement included the careful removal of weeds and grasses as well as the care taken to clean up and place the weeds in the wagon. Students also learned the purposeful movements of hoeing and raking.

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Students were purposeful as they measured and planted seeds at the appropriate depth called for on the seed packets. When they returned to the classroom, the researcher observed to see if the purposeful movement outside would aide in their focus and concentration afterwards inside the classroom as they worked. "Work" refers to Montessori materials that are attractively placed on low shelves for students to easily access. After quietly washing their hands and getting some water to drink, students moved to begin their work in the classroom. Using Observation Form B (Appendix C), the researcher made tally marks to record how many minutes it took the students to get on task. As stated earlier, it was observed during the baseline data collection that it was more useful to see if a child was focused rather than how many works were completed. Students can be focused and complete few works depending on how challenging the work is as opposed to selecting a lot of works and not focusing on what they are doing. If a child was observed exhibiting unfocused behavior such as wandering, working inappropriately with materials, bothering others, or daydreaming, this was documented on the observation form. Anecdotal notes describing the mood of the classroom and specific behaviors that arose during the course of the morning that affected the ability of students to focus and concentrate, ie... other adults entering classroom, fire drills, etc...were also collected.

Daily Reflection

At the end of the work cycle each day of the intervention, a field journal (Appendix E) was used to record unusual events in the classroom or in the school, the mood of the class, interruptions, and any behavioral issues that might have occurred that could have possible implications on student focus and attention as they worked. This journal was also used to document observations and personal feelings of the researcher and how the study was

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progressing. The notes in the field journal helped answer questions such as: How did the day go? Did the transitions go smoothly? Was there a child who was showing marked improvement in attention and focus? Were there any changes that needed to be made to the environment? This ongoing daily reflection was helpful in keeping the researcher focused on the purpose of the action research. During the final week of the data collection process, The students revisited the attitude survey (Appendix B) and recorded feelings about gardening. This data was used to gauge changes in attitudes and to help make needed changes in future extensions of this research.

Data Analysis

This research explored the effects of gardening on attention and focus in a Primary Montessori classroom. As I observed children over the course of eighteen days, I kept this question at the forefront of my mind. Analyzing the data, three key themes emerged: recognizing and releasing previous experiences; encouraging purposeful movement; and maintaining consistency.

Recognizing and Releasing Prior Experiences

The above-ground garden boxes have always been visible from our classroom windows, but have never attracted much attention. Once I announced to my focus group that we would be working in the garden, they instantly became excited. “When can we start?” was the most asked question. I conducted an attitude scale as seen in Figure 1, and students colored a smiley face, a neutral face, and a sad face to indicate their feelings about garden work (See Appendix B).

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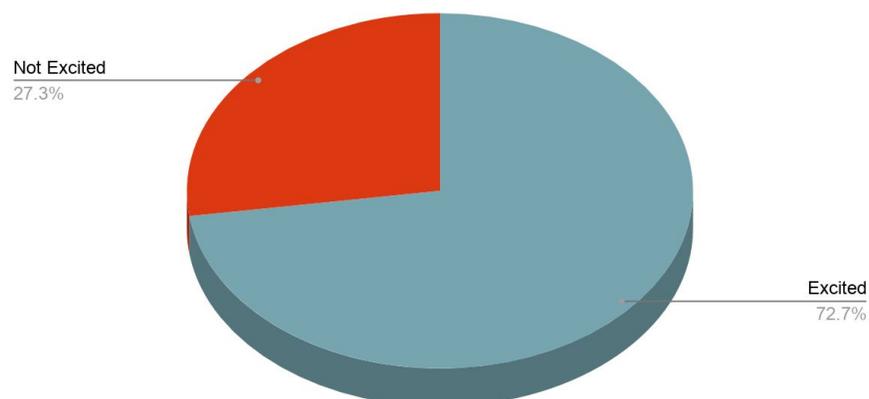


Figure 1. Attitude scale completed before garden intervention

Three of the students who were interested in the garden had never worked in one before, but all uninterested students (27%) actually *had* worked in gardens at home in the past. This information suggested that previous negative experiences could impact these students' willingness to participate in this intervention, potentially negating positive benefits that might be gained. However, as the gardening progressed, I was interested to see that pre-intervention enthusiasm had no impact on the success of the intervention itself. All three of these students were engaged in the project and their off-task behaviors were no more frequent or of a higher magnitude than others. Allowing the children to express their misgivings, but not allowing their hesitation and prior knowledge to impact my expectations for them, was critical to the intervention's success. This was equally true for students who exhibited higher levels of unfocused behavior prior to the study. The post-attitude scale showed that there was a 18.2% increase in terms of attitude towards gardening at the conclusion of the study demonstrating that the experience was a positive one. (See Figure 2.)

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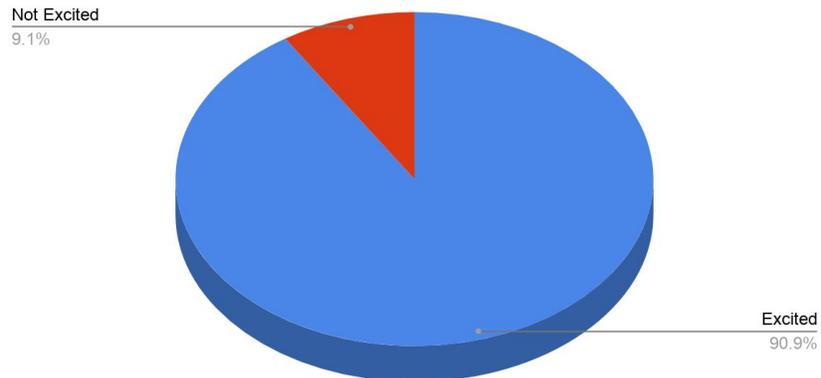


Figure 2. Attitude Scale completed after intervention

Before the gardening began, I gathered five days of baseline data on types and frequency of unfocused behavior. The most common behaviors observed were wandering, misuse of materials, bothering others and daydreaming. Due to these behaviors, the average time it took students to begin the work cycle ranged from 5.27 minutes to 6.18 minutes, with at least three students (Students 4, 8, and 9) requiring upwards of 10 minutes to get on task each day.

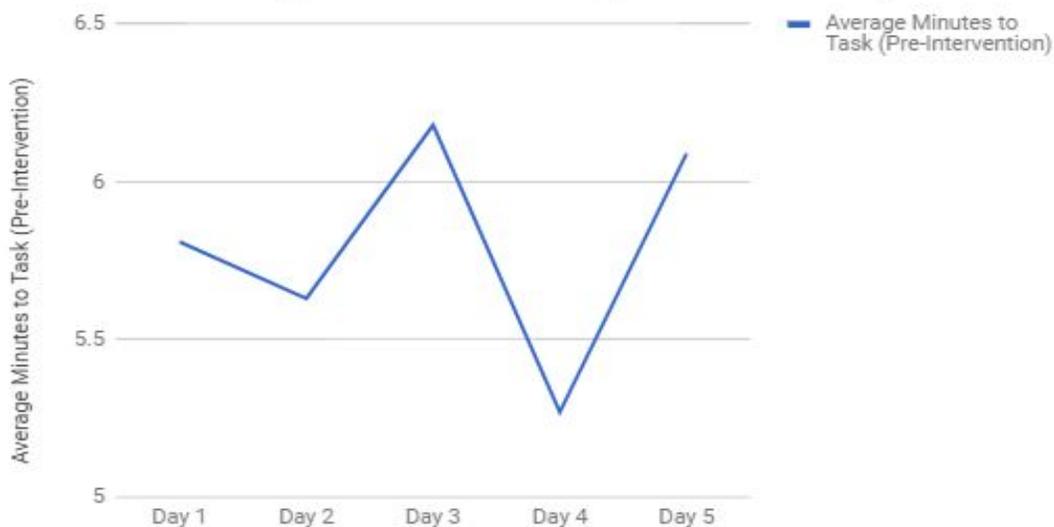


Figure 3. Average minutes to task before intervention

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The baseline data indicated that there was a need to keep a closer eye on these individuals, as they had more difficulty with attention and focus at the beginning of the work cycle. Although the number of works completed were initially recorded, the researcher realized the data was unnecessary, as every student worked at his or her own pace. During the gardening intervention, Students 4, 8 and 9 continued to exhibit the most distracted behaviors in the garden. Student 4 had a tendency to wander around and watched more than she worked. Students 8 and 9 did not exhibit purposeful movement in the garden, but still moved throughout the space. These students were allowed to ambulate at-will outside, even when it was not directly related to the intervention. The question arose that if this movement would positively impact their focus once they returned to the classroom because even though they weren't moving as prescribed, they were still moving. This leads to the next major theme of this research.

Encouraging Purposeful Movement

Before each gardening session, participating students were given a mini-lesson on gardening and then released to work in the garden. Eight of the eleven students worked purposefully to remove weeds from the garden (See Appendix C). There was a joy in their experience which was expressed through their chatter and smiles. Comments were made such as "Look how long these roots are!" and "I found a worm," to which all the children would move to see what they were pointing out. Most students used purposeful movement as they dug and pulled to clean out the garden beds. Student 2 often commented how hard the work was, but never stopped working and remained consistently on task. Off-task behaviors were low for 73% of the students, the three previously mentioned students are an exception.

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In the next component of the study, students returned to the classroom; washed up; and began their work time in the Montessori work cycle. The researcher found that unfocused behaviors gradually decreased for most students over the course of the intervention -- including the three students who were less purposeful in their movements. It was interesting that Student 4 had better results than students 8, and 9, averaging just two minutes “to task” during the last five days of the intervention, despite mostly wandering and observing. This could have been because she was OBSERVING and paying attention, even if she was not engaging as much with the activity. Many of the impacts of the intervention, however, were related to factors outside of a teacher’s control.

Maintaining Consistency

When comparing my daily field notes to the recorded behaviors, a common theme was that students’ off-task behaviors and time to get on task showed a decrease on days students were in the garden consecutively. Each day of the intervention, outlying events (such as school extracurriculars or weather) were recorded. During the month of January, for example, weather and sickness severely impacted class attendance and prohibited our ability to enter the garden on consecutive days except at the end of the month. During the first and second week of the intervention there were days where five to seven children were absent. I found that the more consistently we could visit the garden, the better the outcome in the classroom. It was more of an attitude that I noticed when reading the Field Journal notes. Although all minutes to get on task gradually decreased over the life of the project as seen in Figure 4, there might have been more success had this intervention taken place in late spring, when the weather is more reliable and

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illnesses have curbed. It appears that even when the average minutes to get on task increased, they never returned to the frequency they had at the beginning of the study.

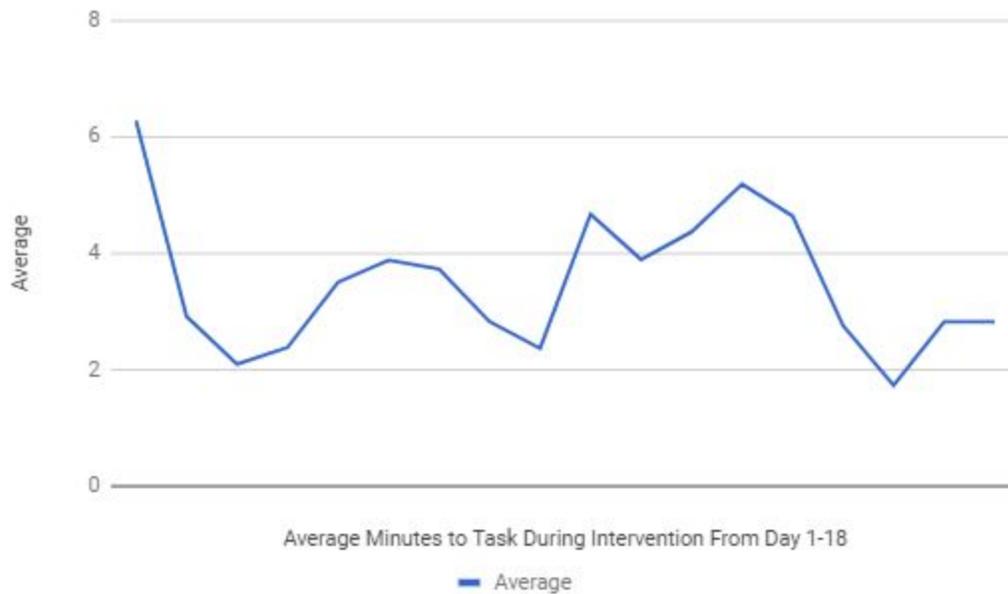


Figure 4. Average minutes to task during intervention

In analyzing this data, the researcher determined that there were several factors that could have affected increases on certain days including Valentine's Day and a school program on Days 13 and 14. On days 9 and 10 it was noted that students had an overall tiredness before they started the daily intervention. Some days, there was no determining factor for the inattentiveness.

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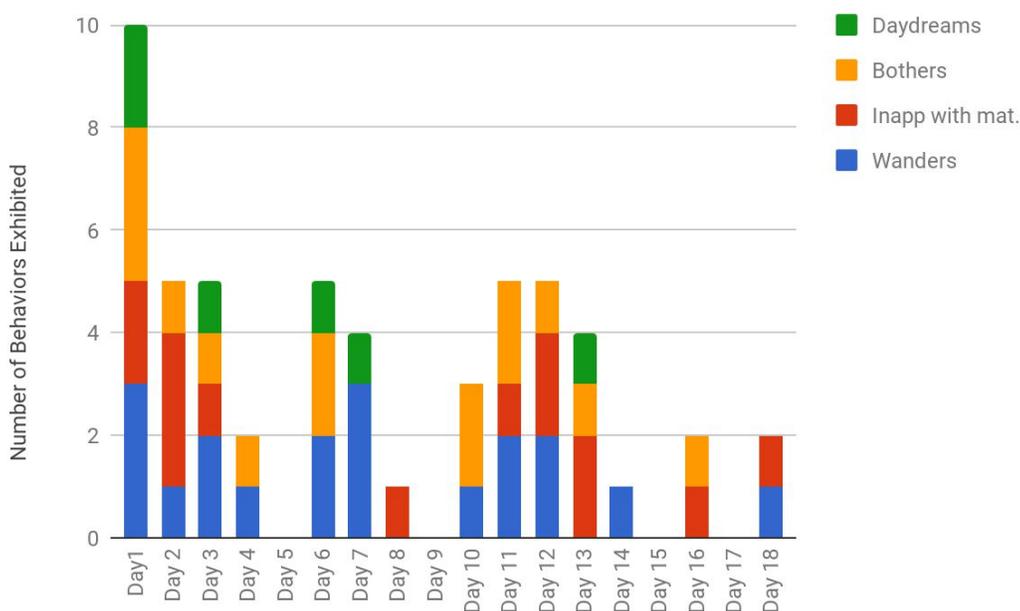


Figure 5. Unfocused behaviors during work cycle

At the beginning of the intervention all unfocused behaviors, as seen in Figure 5, were charting high. The researcher recorded that the newness of the garden activity could have caused an unnatural spike in student unfocused behaviors on Day 1. As the intervention progressed, the number of unfocused behaviors on average decreased. Daydreaming specifically was eliminated.

Even though students got to work faster and fewer students exhibited any non-focused behaviors, these two areas did not seem to be related to each other on any individual day. When observing the trendlines in Figure 6, however, though not drastic, there is a visible increase in time on task as well as a modest decrease in the percentage of students not focused.

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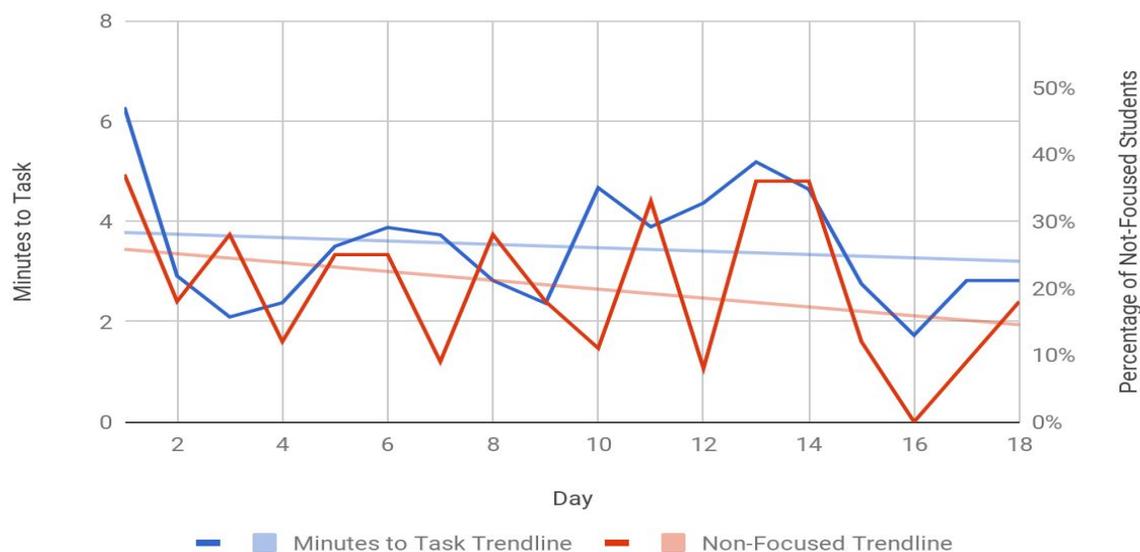


Figure 6. Correlation between minutes-to-task and non-focused behavior

The triangulation of all data collected suggests that there could be some positive effect on attention and focus in the classroom when students are allowed to work in a garden. But, the same effect could be attributed to being outside and being allowed to move at-will. There were also many variables coming into play during the intervention that could have skewed the results such as the weather and illnesses. In spite of those variables, by looking at the trends in the data, it shows student attention and focus increased with a corresponding decrease in inattentive behaviors over the life of this study.

Action Plan

What Do the Findings Mean?

This study set out to determine the effects of gardening on attention and focus in the classroom. Brief gardening mini-lessons, followed by time with hands in the dirt in the classroom garden, gave students meaningful, purposeful time outside followed by the Montessori work cycle upon returning to the classroom. The pre- and post- attitude scales demonstrated that

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students, even when apprehensive in the beginning of the study, were open to the opportunity to participate in the purposeful movement in the garden. Once they began working, they continued even when they verbally acknowledged gardening was hard work. The students anticipated and looked forward to their time in the garden.

Both pre-intervention and intervention data revealed more of the subject students were able to focus and concentrate than could not. The researcher found that what she thought was a serious issue in her classroom was not as overwhelming as she once believed. According to the data collection, four students accounted for 53% of the minutes to get on task, but only 13% of the unfocused behaviors. This interesting result encouraged the researcher to think more on what was preventing focus for others and not just students that had chronic attentional issues. Based on anecdotal notes, the researcher discovered behaviors that had the appearance of non-conformity, such as wandering and daydreaming, could actually be a learning style of the student. The research could not conclude with certainty that the “unfocused” student was not focusing in his or her own way.

When looking at the minutes-to-task averages and the percentages of “focused” students over the course of the intervention, the researcher noted a downward trend in minutes to get on task and an upward trend on the number of students focused on their work at the time of the observation. Several students continued to struggle in both areas, but their progression from day one to day eighteen was still significant.

The data analysis indicates that focus and attention improved slightly, but it could not be concluded with certainty that it was the purposeful movement in the garden that decreased inattention and improved focus. The same results might be replicated by students spending time

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outdoors in other activities such as free play and exploration during nature walks. Field notes and journal observations revealed that this study did not indicate one way or the other if there was an impact on students that always attend and focus well. These students have a well-defined sense of order and good adaptation to the routine and ground rules of a Montessori classroom; therefore, this may have skewed the results.

Changes in Classroom Practice

Based on the enthusiasm of the students as well as the trend towards better time to task and focus on lessons, more time in nature may be warranted during the school day to assist in focus and attention in the classroom. Time in nature has been shown to be linked to mental acuity and concentration, as well as, useful therapy for students with Attention Deficit Hyperactivity Disorder (Louv, 2017). Outdoors activities may not have to be in a garden as this study was designed, but any activities with fresh air and space for exploration of any kind might be beneficial. The researcher will also begin to include the four year olds in her class in the intervention. The researcher will continue to provide time to garden in the mornings through the year, but with less emphasis on gardening lessons. Just like when the Montessori teacher gives lessons on new works in the classroom, once the garden lessons are complete, the students would carry on the work as if the teacher was not there. The teacher becomes the observer and occasional advisor as opposed to the purveyor of knowledge.

Potential Future Action Research

There were several issues during the study that could have affected the results. First, The field notes revealed that there were not many consecutive days in the garden for all students due to severe weather and/or illness. This could be considered one of the anomalies that could have

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affected the data results. A future study is recommended to continue this research in the spring or early fall when adverse conditions would have less impact on the data collection. Future research could also help determine if gardening itself is beneficial by gathering data across two to three different outdoors activities. In gardening, you are creating a final “product” (growing plants), not just observing nature. The researcher felt that the low number of students (eleven) may be a good start, but continuing the research over multiple semesters with future students could also offer more in terms of validation of results. Four-year-olds could be included in future studies as well. The study pointed to a small group of students that consistently took longer to get on task and frequently were unfocused. Targeting this group of children specifically to help increase their attention and focus, as well as specifically what causes are diminishing their ability to focus and stay on task would be helpful.

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References

- Armstrong, T. (1999). Strategies to empower, not control, kids labeled ADD/ADHD. (chapter 3), retrieved from <http://www.ascd.org/publications/books/199273/chapters/Strategies-to-Empower,-Not-Control,-Kids-Labeled-ADD~ADHD.aspx> pp. 1-22.
- Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. *Journal of Environmental Education*, 40(2): 15-38.
- Christakis, D.A. (2004) Early television exposure and subsequent attentional problems in children. *Pediatrics*. 113 (4). pp. 708-713.
- Centers for Disease Control and Prevention (2017). Data and statistics | ADHD. Retrieved from <https://www.cdc.gov/ncbddd/adhd/data.html>.
- Cohen, I. & Goldsmith, M. (2002). Hands on: how to use brain gym in the classroom. Ventura, California. Edu-Kinesthetics, Inc.
- Goerg, Sheena M., "The Effects of Purposeful Physical Activity on Student Concentration in a Montessori Children's House" (2016). *Masters of Arts in Education Action Research Papers*. 170. <http://sophia.stkate.edu/maed/170>
- Habib, D & Doherty, K. (2007). Beyond the garden; impacts of a school garden program on 3rd and 4th graders. retrieved from <https://seedsofsolidarity.files.wordpress.com/2012/03/beyond-the-garden.pdf>
- Hannaford, C. (2005). Smart Moves: why learning is not all in your head. Salt Lake City, Utah:

THE EFFECT OF GARDENING ON ATTENTION AND FOCUS

Great River Books.

Jones, A. & Cossentino, J. (2017) What's going on with this child? Child study for the 21st century. *The NAMTA Journal*, 42 (2) pp. 249-260.

Kutscher, M.L. & Rosin, N. (2015). Too much screen time? When your child with adhd over-connects to technology. Retrieved from http://www.chadd.org/AttentionPDFs/ATTN_06_15_TooMuchScreenTime.pdf

Lillard, A. (2007). *Montessori: the science behind the genius*. New York, New York: Oxford University Press.

Louv, R. (2010). *Last child in the woods: saving our children from nature-deficit disorder*. London: Atlantic Books.

Luborsky, B. (2017). Helping children with attentional challenges in a Montessori classroom: the role of the occupational therapist. *The NAMTA Journal*, 42 (2) pp. 287-312.

Massie, C.N. (2017). Helping children with attentional challenges in the Montessori classroom: Introduction. *The NAMTA Journal*, 42 (2) pp. 265-285.

Montessori, M.(1997). *The California lectures of Maria Montessori, 1915*. Oxford; Clio.

Noddings, A. (2017). Classroom solutions for sensory-sensitive students. *Montessori Life*. 29 (2). pp. 45-49.

Peck, H.L.(2005) Yoga as an intervention for children with attention problems. *School Psychology Review*. 34 (3) pp. 415-424.

THE EFFECT OF GARDENING ON ATTENTION AND FOCUS

Taylor, A.(2001). Coping with ADD: the surprising connection to green play settings.

Environment and Behavior. 33 (1). pp54-77

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Appendix A

**Gardening and Focus in the Primary Montessori Classroom
Parental Permission Form**

January 2, 2018

Dear Parents,

In addition to being your child's Primary Montessori teacher, I am a St. Catherine University student pursuing a Master's of Education. As a capstone to my program, I need to complete an Action Research project. I am going to study the effects of gardening on attention and focus because four and five year olds are working on their ability to concentrate and focus as they complete their activities in the classroom.

In the coming weeks, I will be giving gardening lessons as a regular part of my cultural studies. All students will participate as members of the class. In order to understand the outcomes, I plan to analyze the data obtained from the results of these observations to determine if time spent in purposeful movement in the garden will increase the time students spend on individual works in the classroom. All strategies implemented and assessments given are part of normal educational practice.

The purpose of this letter is to notify you of this research and to allow you the opportunity to exclude your child's results from my study.

If you decide you want your child's data to be in my study, you don't need to do anything at this point.

If you decide you do NOT want your child's data included in my study, please note that on this form below and return it by(date). Note that your child will still participate in the gardening, but his/her data will not be included in my analysis.

In order to help you make an informed decision, please note the following:

- I am working with a faculty member at St. Kate's and a project coach to complete this particular project.
- I will be giving gardening lessons and the students would be participating in working in the garden even without the study. I am using the lesson I have already planned to see if purposeful movement in the garden will have an impact on student focus and attention in the classroom. I will be writing about the results that I get from this research. However, none of the writing that I do will include the name of this school, the names of any students, or any references that would make it possible to identify outcomes connected to a particular student. Other people will not know if your child is in my study.

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- The final report of my study will be electronically available online at the St. Catherine University library. The goal of sharing my research study is to help other teachers who are also trying to improve their teaching.

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- There is no penalty for not having your child's data involved in the study, I will simply delete his or her responses from my data set.

If you have any questions, please feel free to contact me at 843-493-2061. You may ask questions now, or if you have any questions later, you can ask me, or my project coach, Alisha Brandon (abrandon@stkate.edu) who will be happy to answer them. If you have questions or concerns regarding the study, and would like to talk to someone other than the researcher(s), you may also contact Dr. John Schmitt, Chair of the St. Catherine University Institutional Review Board, at (651) 690-7739.

You may keep a copy of this form for your records. Please sign if you want your child's data excluded.

Linda Webb

Date

OPT OUT: Parents, in order to exclude your child's data from the study, please sign and return by [DATE]

I do NOT want my child's data to be included in this study.

Signature of Parent

Date

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Appendix B

Child: _____ Date: _____

Color the face that matches your feelings.

Before working in garden

1. How do you feel about working in the garden?



Excited Not sure Nervous/doesn't want to

2. Do you think you will like working in the garden??



Yes Not sure No

Following working in the garden

1. How do you feel about working in the garden?



Excited Not sure nervous/ doesn't want to

2. Do you want to keep working in the garden?



Yes Not sure No

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Appendix C

Observation of Behaviors in the Classroom

Date: _____ Time: _____

Student	Minutes to get on task					Unfocused behavior			Focused/Not		
	1	2	5	10	15	Wanders	Inapprp with work	Bothers others	Day dreams	Focused on work	Not Focused
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

Anecdotal Notes:

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Appendix D

Observation of Behaviors Outside Recording Sheet

Date _____ Time: _____ Weather: _____

Title of Lesson: _____

Student	Child participated	Time in garden	On task	Off Task
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				

Anecdotal Notes:

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Appendix E

Webb Field Journal/Notes

Date/Time:

Number of Children:

What is the general mood of the classroom?

Were there any special events today that would affect the mood of the class?

How did the lesson go?

Were the children engaged?

Did they seem to enjoy their time in the dirt? List any special moments.

Were there any behavioral issues on this day?

Reflection: