The Divergent Learning Journal
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The Divergent Learning Journal

SUBMISSION GUIDELINES

The Divergent Learning Journal is a peer-reviewed, scholarly journal based on the concepts of working with divergent learners. All submissions should relate to or share an emphasis on working with divergent learners.

A divergent learner is someone who:

- is a person of average to exceptionally bright intelligence;
- does not easily relate to traditional curriculum, methods, school rules, and values;
- is no more likely to have learning disabilities than others; and
- experiences difficulty unless the school recognizes his/her innate personality traits and employs strategies to engage the divergent learner.

Recognizing the characteristics of divergent learners and knowing how to relate to these students is critical to teaching them effectively.

Articles sent to the TDLJ for publication consideration must adhere to the following guidelines:

1). Articles must be applicable to divergent learners.
2). Submissions should be no longer than 3000 words in length.
3). Submissions must follow the American Psychological Association standards for publishing guidelines.
4). Articles should be submitted to Dr. Chris Burkett, TDLJ Co-Editor, as an attachment in Word format. Each article will be sent for peer review after the submission deadline has passed.
5). All submissions must be received by June 15, 2011 to be considered for the Fall 2011 issue.

Send articles to:
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The Effect of Movement on Academic Achievement in Math

for Kindergarten Students

Dawn Corley
Columbia College

Abstract
Connections are shown between the incorporation of movement into a math kindergarten curriculum and the learning of numbers. A kindergarten class participated in Brain Gym™ exercises and was taught motions for the digits 0 through 9. The motions for the digits were used to help increase the students’ cognitive knowledge of numbers to 31. This knowledge was displayed in counting, writing and identifying the numbers. Using movement in the classroom was deemed to be beneficial for the students. The total overall increase of students reaching the target goal was four before the movement intervention and a total overall increase of 12 after the implementation of the intervention.

Over the past several years, a new push for movement in the classroom has been thrust into the world of education. Students are no longer expected to sit at their desks or tables for an entire day and effectively learn. The results of brain research have motivated teachers to try new ways to get their students learning while moving. Programs have been created and implemented in kindergarten classrooms to engage a student’s body while learning letter sounds and words, and the results have been astounding. Many kindergarten students struggle with numbers, but there seem to be few published programs that connect bodily movement with mastering the number skills that are vitally important to the success of kindergarten students. Because of recent research connecting movement with enhanced memory and learning, this study tested the theory of connecting bodily movement to learning numbers.

Recent brain research showed that movement was a very important part of a child’s cognitive development. Jensen (2005) stated that most neuroscientists agree with evidence that showed a strong correlation between movement and cognition. Researchers made an amazing discovery: movement and learning processes take place in the same area of the brain. Brain research has also provided strategies for educators to use when stimulating the brain to gain and maximize short and long-term memory (Rushton & Larkin, 2001).

One strategy to stimulate the brain that has proven effective is movement. Children can benefit from this type of teaching and learning. Teachers need to use a variety of research-based approaches to teach skills. Each child has unique ways in which he or she learns, and using one approach in the classroom will most likely not meet the needs of all the students (Rule, Dockstader & Stewart, 2006). Rushton and Larkin (2001) concluded that the alphabet and numbers are learned better if they can be connected to images and expressive movement. It has also been suggested that movement can be implemented across the curriculum easily and effectively (Rieg & Paquette, 2009). Jensen’s (2000) research encouraged teachers to engage students in movement on a
regular basis so that they can use their bodies to learn. “Teachers must promote active learning through incorporation of research on brain-based education and the corresponding academic needs of the student” (Madrazo & Motz, 2005, pp. 58-59).

Memory is an important part of learning, and to truly learn something one must transfer learning into long-term memory. Sousa (2001) stated that it is impossible to recall what has not been placed into long-term storage. Research showed that items placed in memory were stored in different areas of the brain. When many connections to new learning were made, the learner could understand the new learning, and this understanding helped the learner have more opportunities to retrieve the new learning. Using combined visual, auditory, and kinesthetic teaching techniques helped in this process. Research showed that the average retention rate after 24 hours is 5% when taught by lecture, 20% when taught by visual, but 75% when taught by doing. Wolfe (2001) concluded that movement provides extrasensory input to the brain and that movement in teaching enhances memory for learning.

One type of memory, semantic memory, has a very weak memory pathway in the brain; therefore, one can cram for an exam but not recall the information the following day. Because of this, instructional strategies that require movement were found to be very important since they can link semantic information such as memory for words, facts, and numbers to movement and place the information in different memory pathways (Tate, 2003). “This cognitive-motor link is absolutely essential for retention of information” (p. 85). Tate also suggested that when students are actively engaged during learning, difficult concepts become easy to understand.

Along with movement, emotions that make connections are essential in the retention of information. The emotional-relational connection was found to be very important to the memory process, because memory has been closely linked to emotion (Hannaford, 2005). Hannaford also suggested that experiences involving the senses, emotions and movements fully engage the learner. Brain research showed certain movements can cause the release of chemicals that help learners feel good, thus waking them up, increasing energy levels, and improving their ability to store and retrieve information (Jensen, 2000).

Method

Participants

The participants in this study were 18 kindergarten students who attended a rural public elementary school in Oconee County, South Carolina. The students ranged in age between 5 and 7 and included 11 boys and 7 girls. Of these, there were 15 Caucasian students, two Hispanic students, and one Bi-racial student. Eight of the students participated in a 4-year-old preschool program, and three of the students were in their second year of 5-year-old kindergarten. The students came from middle to low income families. None participated in the reduced lunch program, and 12 participated in the free lunch program.

Materials

Before the study began, a math inventory was created by the researcher for the students to complete (Appendix A). The inventory showed each student’s attitude towards math and how he/she perceived his/her math achievement. At the conclusion of
the study, the same inventory was given again, and a comparison chart was made to see if improvements or differences could be noted.

The students also participated in Brain Gym activities created by Paul and Gail Dennison. The activities used were selected from the book Brain Gym (2010) and were chosen because of their academic benefits relating to math and recent brain research. The following Brain Gym activities were used during the study: The Elephant™, Neck Rolls™, The Owl™, The Calf Pump™, and The Gravity Glider™.

To conduct this study, the researcher created a specific motion to coincide with each digit from 0-9. These motions were created by the researcher to relate movement to learning and memory. To help teach these motions, small posters were constructed and used as visuals while the lessons were taught. Each poster was hung in the classroom after the motion to each digit had been introduced. Samples of the posters and detailed instructions for the movements can be found in Appendices B and C.

Procedure

The researcher collected data every two weeks for six weeks on the achievement of the students in writing, counting, and identifying numbers to 31. This data was to assess student progress in these areas without the movement intervention. The numbers 0-31 were chosen as a focus because of the South Carolina Kindergarten Standards for kindergarten. To begin the study, students completed the number inventory created by the researcher and were assessed on counting, writing, and identifying to 31. The regular math curriculum was followed during the study. On day one, the lesson began with an introduction to a Brain Gym activity with a detailed example and time to practice. After that, the motion for the digit 0 was introduced, and the visual was shown. Students had time to practice the motion and say the digit as they made the motion. The regular math curriculum was then followed. On day two, the lesson began with a review of the Brain Gym activity taught the day before, and a new one was added. The motion for 0 was reviewed, the motion for digit 1 was taught, and a visual was shown. Practice time was allowed. Brain Gym activities were reviewed, and a new one was added each day during the first week of the study. After the first week, each lesson began by the students or the teacher choosing a Brain Gym activity to use, with all being used once each week. Each previously taught digit motion was reviewed every day, and a new digit motion was added, ending with the digit 9. The process of teaching the motions took two weeks. After two weeks of teaching the motions, each math lesson began by reviewing all digit motions in and out of order, also putting digit motions together to make the numbers 10-31. Students were also given the opportunity to use the motions to create numbers that their classmates had to guess. When making any of the motions, it was important that the students say the name of the number at the same time to connect the name with the motion. The motions for the numbers to 31 were also incorporated throughout the day as the opportunity presented itself. During the study, data from oral recitations and written assessments were collected every two weeks to determine the academic achievement of the students in the areas of counting, writing, and identifying to 31.

At the conclusion of the study, the students completed the same number inventory to see if their attitude toward numbers and their perception of their math achievement had changed during the six weeks of movement intervention. All data were collected, studied, and compared. The compiled data were analyzed to determine if the
implementation of the movement program for math made a significant impact on student learning in the area of counting, writing, and identifying numbers from 0-31.

**Results**

Using movement in the classroom to enhance the teaching of recognizing, counting and writing numbers was deemed to be beneficial for the students. During the six week period prior to incorporating the movement activities the students made very little gains in identifying numbers to 31, counting to 31, and writing to 31. The total number of students who could identify to 31 did not increase, while the number of students who could write to 31 and count to 31 both increased by two (Tables 1 & 2). The six weeks of integrating movement into the math curriculum produced improved results from the students. The total number of students who could count to 31 increased by two, the same improvement seen without the intervention. The total number of students who could identify to 31 increased by four, while the most improvement was shown when the total number of students who could write to 31 increased by six (Table 2). The total increase of students reaching the target goal was four before the movement intervention and 12 after the implementation of the intervention.

**Table 1: Before Movement Intervention**

<table>
<thead>
<tr>
<th></th>
<th>Beginning</th>
<th>After week 2</th>
<th>After week 4</th>
<th>After week 6</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students who can identify to 31</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Students who can count to 31</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Students who can write to 31</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Total overall increase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>
Table 2: During and After Movement Intervention

<table>
<thead>
<tr>
<th></th>
<th>Beginning</th>
<th>After week 2</th>
<th>After week 4</th>
<th>After week 6</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students who can identify to 31</td>
<td>7</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Students who can count to 31</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Students who can write to 31</td>
<td>8</td>
<td>9</td>
<td>14</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Total overall increase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Analysis of the math inventory given before and after the intervention showed that the number of students who liked numbers increased by two, while the number of students who liked to count decreased by two. The students who liked to write numbers increased by three, and the total number of students who thought they were better at numbers as compared to letters decreased by four. The most change was observed when the students were asked if they thought numbers were hard to remember. Before the movement intervention, 11 students agreed that remembering numbers was difficult for them, but following the intervention, that number dropped to zero. All students were now in agreement that numbers were no longer hard for them to remember (Tables 3 & 4).

Table 3: Number Inventory Before Intervention

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you like numbers?</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>Do you like to count?</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Do you like to write numbers?</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Do you think numbers are hard to remember?</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Numbers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think you are better at numbers or letters?</td>
<td>14</td>
<td>4</td>
</tr>
</tbody>
</table>
### Table 4: Number Inventory After Intervention

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you like numbers?</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Do you like to count?</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Do you like to write numbers?</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Do you think numbers are hard to remember?</td>
<td>0</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Numbers</th>
<th>Letters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you think you are better at numbers or letters?</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

### Discussion

Based on the data collected during this research study and observations made, I concluded that connecting movement with numbers brings about enhanced and exciting learning. The results of my research found that the majority of researchers (Jensen, 2000; Rushton & Larkin, 2001; Sousa, 2001; Tate, 2003; Wolfe, 2001) agreed that movement is essential for optimal learning. My results agreed with their findings. While only four additional goals were met by students before the movements were taught, 12 additional goals were met after students participated in the movement lessons. The students were more engaged in learning during the math lessons and showed more excitement than before. During the implementation of the motions, the students could not wait until math time. They would ask if it was time yet or remind me of math time in case I had forgotten. Intrinsic motivation was a factor in the success of this study. The students enjoyed the Brain Gym™ exercises and embraced the motions for the digits 0-9 with enthusiasm. Now, when they are asked a question that requires a numerical answer, they answer with their bodies.

As I looked at the data concerning identifying, counting and writing to 31, it was interesting to note that the number of students able to identify and write numbers to 31 increased when the motions were implemented. During both six week time periods, the number increased by two students. Even though this increase was the same both times, at the end of the study there were only two students who could not count to 31. One of these students has a severe speech problem that interfered with his learning to count, and the other student struggled with counting and numbers in general because of a lack of exposure to mathematical ideas before entering kindergarten. The data on number identification to 31 also gave insights to the advantages of using movement with numbers. Seven students did not reach the goal of identifying all numbers to 31, but great gains were noted among these students. Most made worthwhile gains by identifying all but one to three of the numbers, while only two students were lacking between 19-22 numbers. One of these two students was the struggling student mentioned above. Writing to 31 seemed to be a struggle for many in my class and was one of the main reasons for creating this movement program. I had eight students who were unable...
to write to 31 at the beginning of the program, but after the program only four were not able complete this task. Of those four, two could write to 29, one to 22, and the struggling student could now write to 12, where, as at first, she could only write to 4. This student started kindergarten as a blank slate, and although she did not master the goals, she did show much improvement and enthusiasm while using the number motions. Before the program, she was at a standstill, and I was searching for ways to help her.

The math inventory that was given at the beginning and end of the implementation period also provided insights to the students’ attitudes toward numbers. At the end of the program, more students said they liked numbers and liked to write numbers. The change in the students’ answers to the question about numbers and memory is attributed to the connection between movement and memory as supported by research. One inventory question I thought would turn out differently was whether the students thought they were better at numbers or letters. Before the program, more students were confident with numbers, but at the conclusion of the program, instead of the number of students confident with numbers increasing, the total of students who thought they were more skilled with letters increased. One reason behind this could be the idea that no matter what is taught, a child will learn and develop at his/her own rate. Also, during the kindergarten year, the students are learning how to put letters together and read, which excites them. Even though they are learning how to add and subtract, they do not see that these mathematical accomplishments are just as great as learning to read. A final factor that I believe influenced this answer is gender. Boys tend to enjoy math more, so it was not unusual that, before the program, all but one boy said that they were better at numbers. After the program, that boy changed his answer to numbers, but three other boys were now more confident with letters. Those three boys were all in the highest reading group, so it was easy to see why they chose letters over numbers.

All of the results from implementing movement into the math program were so astounding that I will continue using this method of teaching. The program was implemented midyear, but next year I will begin the program at the beginning of the year and expect even greater results. I recommend and encourage other primary grade teachers to use this program to supplement any current math curriculum. It was easy to implement, not very time consuming and the outcome was well worth the effort.
References


Appendix A

Math Inventory

Do you like numbers?

Do you like to count?

Do you like to write numbers?

Do you think numbers are hard to remember?

Do you think you are better at numbers or letters?

123 abc
Appendix B

Movement Descriptions

0 – Move your open hand in a circular motion in front of your stomach as if something is yummy.

1 – Place both open hands in front of you with thumbs on top and bring them down as if your hands are the drum sticks hitting a drum.

2 – Bend your arm and pretend you are pulling a chain to make a train whistle.

3 – Move your arm across your body in a wave motion as if a caterpillar is crawling in front of you.

4 – Pull your arm across your body as if pulling a door knob, and then move your forearm straight up as if getting ready to arm wrestle.

5 – Move your hand, open and palm facing down, across your forehead.

6 – Place both arms in front of you and roll them one in front of the other.

7 – Place your open hand about head level and come down sideways as in a karate chop movement.

8 – Move both open hands toward each other, having them cross ending with fingernails touching with the backs of your hands facing each other.

9 – Hold up a fist with one hand and bring it down like a hammer into the opposite hand.
## Appendix C

### Movement Posters

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Time of Day Effects on Mathematics Achievement of First Grade Students

Brandy M. Engel
Columbia College

Abstract

This study investigated the effect of time of day on first grade students learning in mathematics. The population consisted of sixteen students, nine male and seven female, eight Caucasians and eight African-Americans. The study took place over a period of four weeks during which math was taught in the morning for two weeks and the afternoon for two weeks. The students’ weekly grades were averaged for morning and afternoon sessions. The results of the study showed little effect on learning from time of day.

Many people tend to follow scheduled routines throughout their lives. People are becoming more time conscious as school, church, and extracurricular activities increase. Although teachers do not set their own schedules, they do establish a routine in which they decide the time frame for instruction and activities. Teachers often plan their schedules with regard to special events, personal preferences, or a fondness for a particular subject. Unfortunately, teachers do not always consider their students’ preferences when planning their instruction schedule. Most teachers take advantage of time in the morning to teach new material or assess learning. However, all students may not be awake and alert during this time of day. Does time of day really affect student achievement, or is student engagement really what matters?

Just like adults, children often have energy peaks at certain times of the day. Working during a child’s peak learning time helps learning be more effective and efficient. In order for a child to learn, he or she must be attentive and engaged in the lesson. “The key to increasing achievement is not necessarily more time in school, but maximizing the amount of academic learning time.” (Aronson, Zimmerman, & Carlos, 2000, p. 2). Studies have shown that students are alert, engaged, and perform better at their preferred time of day. About 33% of high school students have no time of day preferences. Fewer than 10% of students favor morning or late morning, and 15% prefer afternoon or evening. Some individuals even have multiple preferences (Callan, 1997).

Sjosten-Bell (2005) completed a study on twenty third grade students’ preference for time of day. Students reported that morning, followed by mid-morning and late afternoon were preferred. Sjosten-Bell’s findings noted that none of the students consistently chose a time of day. Students tuned into their physical environment and felt more alert if they were not hungry and the class had a quiet, comfortable temperature. If a student was experiencing physiological or emotional problems, a teacher had difficulty keeping him or her engaged. Therefore, it is essential that a student’s basic needs are met first in order for them to be alert.

Research was conducted on 204 fifth graders and 202 tenth graders who were divided into three groups based on their average yearly mathematics scores. The students were asked to report their levels of attention throughout the day. The findings concluded that the tenth graders reported an increase in concentration in the morning, while fifth graders preferred the afternoon (Klein, 2001). Teachers have commonly made the assumption that students learn better in the mornings. This assumption is not valid due to many factors that can affect the students’ preference. Ammons’ (1995) findings showed that student achievement is dependent on the preference for time of day. When students’
learning styles are met, their performance is better. She also reported that students performed better during the teacher’s preferred time of day as well.

Research has shown that the time of day can influence a student’s efficiency of cognitive processing. “More recently, other investigators have reported that time of day influences the efficiency of short-term memory, sustained attention, inhibitory processing and semantic activation” (West, Murphy, Armilio, Craik, & Stuss, 2002, p. 3). The brain goes through many levels of a cycle in which there are highs and lows during the day. The highs and lows occur every 90 to 110 minutes. If students are drowsy or have low energy, they are experiencing the brain’s low energy cycles. These low energy occurrences can affect a student’s mood as well (Jensen, 2005). Personal perceptions of when people learn best are often influenced by circadian rhythms, a 24 hour cycle in the physiological processes of an individual, correlated with body temperature and alertness (McElroy & Mosteller, 2006). By creating a safe and engaging environment, teachers can keep students alert even during the low levels of the cycle. As teachers implement creative and new ideas, learning becomes more meaningful and interesting to students. In turn, the low energy levels can become high levels because the students are engaged and interested in learning.

However, Millar (1980) reported that short term performance declines as the day progresses. It is suggested that physiological arousal, which rises throughout the day, may benefit retrieval efficiency from long term memory. “When student behavior is most appropriate and when students are best able to learn should be important considerations in decisions regarding school starting time, the length of the school day, how many periods to schedule in a day, and how long the school year should be” (Muyskens & Ysseldyke, 1998, p. 411). Muyskens and Ysseldyke conducted a study on a group of second to fourth graders. Their results concluded that academic response time activities and individual structure were higher in the morning. Nonacademic activities and whole group instruction were higher in the afternoon. As a result, they noted no significant impact of time of day on academics.

“Circadian arousal impacts both physiological and intellectual functioning in humans and has been shown to vary significantly over the lifespan” (Wickersham, 2006, p. 259). Children ages seven-twelve typically have higher response times in the morning but that transfers to evenings as they reach adolescence. The preference for evenings continues through adulthood and then shifts back to mornings. Research was conducted on 526 children ages two to six. The students’ parents filled out an adaption of Horne’s and Ostberg’s Morningness-Eveningness Questionnaire (MEQ). The results showed 90% of two year olds preferred mornings compared to 76% in the other age groups. A slight 3% demonstrated a preference for evenings (Wickersham, 2006). However, this information was based on the parents’ opinions rather than the students’ performance.

During puberty, students begin to favor evenings as their time of day preference. Early school start times force students to begin working at a time of day that may be too early for them, and this can affect their academic performance. A study, comprised of 811 students, ages ten to seventeen, determined the students’ preference of time of day using a questionnaire. The Pupil Morningness-Eveningness Questionnaire (PMES) showed a decrease in scores as a preference for eveningness began around age twelve. The PMEQ score indicated that students who preferred mornings showed an increase in student achievement (Randler & Fech, 2009).
“When schools do not relate time of day to learning effectiveness, class scheduling is delegated to administrative personnel whose guiding principles are purely technical and psycho-educational factors are irrelevant” (Klein, 2004, p. 441). Klein researched twenty-five seventh, eighth, and ninth grade classrooms. Classes were held during the early morning, late morning, and early and mid-afternoon. A gradual increase was shown from early morning to mid morning. The largest decline was in the late afternoon between 12 and 1 p.m. This may have stemmed from the brain low levels of energy after recess. During prolonged tasks, mental fatigue gradually developed followed by a weakening of cognitive processing skills (Klein, 2004).

According to research, concentration and alertness are essential components of scholastic success. When teachers are aware that their students have become idle, they can redirect their teaching to help the students become more engaged and actively involved. Students’ low levels of energy throughout the day can be transferred to high energy if they are intrigued by the learning taking place in the classroom and this will significantly impact students’ success in mathematics.

**Methods**

**Description of Study**

This study was conducted on sixteen first grade students. Their assignments were recorded and analyzed to determine if time of day affected their mathematic achievement. Mathematics was taught in the mornings for the first two weeks and in the afternoons for the last two weeks of the study. A combination of assessments was averaged and compared for morning and afternoon time periods.

**Participants**

The study was conducted in a rural elementary school in Lancaster, South Carolina. There were approximately 650 students in the elementary school with 120 students in the first grade. There were sixteen students, nine boys and seven girls, ranging from ages six to seven included in the study. There were eight Caucasian students and eight African American students.

The academic range varied with seven students performing above grade level, six on grade level and three below grade level. One student received speech therapy twice a week and another student received tutoring three days a week. The three students below grade level were removed for reading intervention four days a week for forty minutes. Eight students came from two-parent households, seven students lived in single-parent households and one student lived with his grandparents. Seven students paid for breakfast or lunch, while nine received free or reduced breakfast or lunch. Two students have been diagnosed with ADD and one student with ADHD. Another student is receiving counseling for an emotional disorder.

**Materials**

The materials used to conduct the study consisted of an Interactive Whiteboard in which the students and teacher could manipulate the coins and replicate coins so students could make note of coin characteristics and practice counting. Center activities and dry erase boards allowed extra practice, homework sheets were provided by Everyday
Mathematics, and the teacher wrote tests that resembled the students’ homework. Students also gained practice using the Classworks computer program.

**Procedures**

The study was conducted in a first grade classroom at various times of the day for a total of four weeks. In the first two weeks math was taught in the late afternoon, as mandated by the school and in the last two weeks math was taught in the morning before lunch. The teacher taught counting groups of coins up to one dollar for the study. The students were introduced to the concept using an Interactive Whiteboard, dry erase boards, replica coins, paper, and pencils. The subjects were assessed using teacher observation during center time, dry erase activities, and Interactive Whiteboard activities. Homework and teacher-made assessments were used in assessing the students’ understanding and helping plan for future instruction.

To begin the study, the researcher introduced the coins and their characteristics using the Interactive Whiteboard. Pennies and nickels were taught the first week, while dimes and quarters were taught the second week. During the third and fourth weeks, students practiced counting groups of coins and trading in groups of coins. The teacher used the Direct-Instruction model to teach the lessons. A mini lesson was taught each day to review the previous day’s materials. Students were given replica coins to practice counting while the teacher led the instruction and they practiced counting with a partner. Center activities were designed to give the students extra practice. Homework and assessments were given to help the researcher determine the effect of time of day. A review was used to answer any additional questions and to make connections with new material.

A checklist was kept to help the researcher record the time of day, behavior, and student achievement. The checklists included observations, homework completion, and assessments. Further instruction was based on these observations.

**Results**

The researcher chose to keep a checklist to document any change in achievement in mathematics and noted the time of day, attention span of students, and grades. The results were compiled and displayed in a bar graph. Grades of 69% and higher are located on the x axis while the number of students is displayed on the y axis. The graph displays any effects time of day has on academic achievement in mathematics.

*Figure 1: Time of Day*
Research shows that time of day slightly affected the middle range of student achievement. This range was between 80% - 89% accuracy. However, the researcher noted no major changes with high or low performing students. Students affected by time of day were those who qualified for ADHD designation. Their math averages showed more improvement before lunch time. Attentiveness and behavior showed improvements during math in the morning, which could have affected their performance.

**Discussion**

In this study, I researched the effect of time of day on first grade students in mathematics. Results did not show any major effects of time of day on student achievement. Most students seemed to perform at about the same level without regard to the time of day. However, one student who is typically a high performing student made several careless mistakes when completing math in the morning.

I also noted that students diagnosed with ADHD performed better in the mornings and showed slight improvement in their grades and major improvements in their behavior. Students with two parent homes showed more consistent performance. Those students were helped nightly with homework and demonstrated a more positive academic performance than those who did not have parental support at home.

Several factors could have influenced the results of this research. First, the results might have been more reliable with more student participation. Class size can be a factor when determining student achievement. The research was conducted on a class of sixteen while other classes in the school have between twenty-one and twenty-five students. Teachers with smaller class sizes have more time to individualize instruction in order to effectively meet the needs of all students. Secondly, the research was conducted over a period of only four weeks.

Learning preferences could have also influenced the research. Students’ preferences differed in terms of their ideal learning environment. Seating, lighting, noise,
and temperature are all factors that affect students’ ability to learn. Lack of accommodations may have coexisted with students’ preference of time of day.

Student background knowledge has major effects on student achievement. A majority of my students attended a preschool program before entering kindergarten during which they were exposed to math concepts at an early age. However, some students did not have this prior background knowledge.

Morning instructional time was considered before 10:00 a.m. due to early lunch and other special activities. Afternoon instruction was usually taught around 12:30 p.m. Teachers are often limited in how and when they teach due to the schedule provided by administrators. It is uncertain as to whether all students are more alert during the morning. According to research, students can be taught effectively if they are interested and engaged no matter the time of day.
References
Callan, R. J. (1997). Giving students the (right) time of day. Educational Leadership, 55(4), 84-87.
The Effect of Character Education on the Academic Achievement of High School Students

Katharine P. Griffin
Columbia College

Abstract
The goal of this study was to increase academic achievement of high school students by integrating a character education curriculum into the existing South Carolina standards for English IV. The study lasted approximately 45 days in two classes of 21 high school seniors. Students discussed and wrote about character in literature and applied what they observed to their own lives in the classroom. In a study completed in the spring of 2010, 62% of students involved in a classroom in which the teacher implemented a character education curriculum improved their overall average in the class; no students failed the course. The data suggest that there is a positive correlation between character and academic achievement.

School was once thought to be the safe place in society from which students emerged as better citizens; however, society’s moral and ethical decline is beginning to affect the way schools operate. In 1999, two students from Columbine High School killed 12 of their peers and one teacher before they killed themselves. Although they were both from supportive homes, they were bullied in school; they perceived that they had no other outlet for their anger and hurt. Even the moral values of teachers, like Mary Kay LaTourneau who gave birth to her 13-year-old student’s baby, are declining in the United States. In response, schools are initiating character education programs to enhance the overall atmosphere of the school. Incorporating a character education program, especially within the curriculum of secondary education, has the potential to positively affect academic achievement.

Although character education was cut from public school education in the 1950s (Skaggs & Bodenhorn, 2006), it is currently on the rise again in the United States (Martinson, 2003; Britzman, 2005). While positive, character education is often perceived to be solely the job of the parents; in fact, it is impractical to separate character education from school, since school “occupies about a third of a child’s waking time” (Damon, 2005, p. 21). Current programs, such as Character Counts!, Community of Character, and Six Pillars of Character (Skaggs & Bodenhorn, 2006; Traub, 2005) are the most common character education programs that are implemented in the United States to re-establish character education in school.

Implementing a positive character education program, especially in the secondary school setting, poses some challenges. Teachers are often reluctant to impose personal beliefs of character on students because some directives may not match the students’ cultural identity. In addition, parents and community members do not often support educators in the area of character education; therefore, it is difficult to adequately administer in the school setting (Britzman, 2005). It is most difficult to administer a character education program in the secondary setting, as adolescence is such a
transitional time in a student’s life. Since learning is impacted by emotion, and many high school students do not have full control of their emotions, character education programs improve academic achievement because they address the student’s emotional needs, which is a factor in learning and retention (Ryan, 2007).

Character education programs that are carefully planned and implemented are the most successful. Programs also thrive when individual schools identify their core values, create explicit expectations for students, and involve the entire school atmosphere (Bulach, 2002; Dovre, 2007; Milliren & Mitchell, 2009). The Character Education Partnership defines effective programs as comprehensive, school-wide, and inclusive of the entire faculty and staff (Dovre, 2007).

Indeed, the moral behavior of teachers is important, as “the teacher’s example is his or her most powerful tool of moral education” (Osguthorpe, 2008, p. 288). To recognize the importance of teacher morals, The National Council for Accreditation of Teachers (NCATE) revised its standards in 2002 to evaluate prospective educators’ moral development to include character in the teacher evaluation process. Undeniably, the teacher’s character can positively and negatively influence that of his/her students (Osguthorpe, 2008).

Positive character education programs are a “proactive and purposeful approach designed to create a healthy learning environment to help each student incorporate values necessary for achievement” (Britzman, 2005, p. 293). In response to a more positive environment, academic achievement improves. High schools that have implemented a character education program have seen an increase in academic achievements like the SAT, graduation rates, and success after graduation (Bulach, 2002; Dovre, 2007). With a positive environment, there is more time for instruction (Dovre, 2007). Although there is limited research as to the effects of character education on the academic achievement of high school students, the existing data suggest that there is a positive correlation between character and academic achievement of high school students.

Method

Participants

The participants of this study were 42 high school seniors enrolled in English IV, an extensive course in literary trends in British Literature, in a school in the Olde English District of South Carolina. In alignment with South Carolina curriculum standards, students in this course are required to read and analyze literary works, and continue refining the writing process. In addition to the existing South Carolina curriculum in English IV, each student is required to complete a semester-long Senior Project.

The demographics of the students varied according to academic ability, ethnicity and gender, and socioeconomic level, but were a typical sample of the population at the high school. Six students in this study had an individualized education plan (IEP), and one was not a native speaker of English. The subjects also ranged in ethnicities. Of the 42 students, 9 were African American, 30 were Caucasian, and 3 were classified as other. Twenty-six of the subjects were male and 16 were female. Currently, the unemployment rate in this area of South Carolina is higher than 20%, and as a result, about 40% of students at the high school qualified for free and reduced lunch.

Students were chosen for this study to enhance both their academic achievements and personal development in preparation for graduation in May 2010. Since the students
met for 90 consecutive days, and the study did not begin until day 45, teacher observation of student growth was realistic and accurate.

**Materials**

The model chosen to implement as a character education program was *Integrating Character Education Program into the Curriculum: Grades 9-12*, which was originally created for Richland One School District in Columbia, South Carolina. The model identified 10 character traits that were most important among administrators, teachers, parents, students, and community members in the district. Within the guide, character education standards are meticulously aligned to the existing academic standards; the character standards highlight the 10 traits as identified by the district.

Richland One School District identified 10 traits on which to focus every day in the educational setting. The 10 essential traits of positive character in the model include: respect, honesty, cooperation, good citizenship, responsibility, self-discipline, caring, kindness, fairness, and dependability. The model suggests ways to implement instruction; however, implementation of the standards has been modified to meet the needs of the participants. As suggested by the model, Character Education should not be an add-on to the curriculum; rather, it should be integrated directly into the curriculum as a recurring theme in education. The model is designed for implementation in core disciplines in the secondary setting.

The researcher recorded personal observations of student growth and behavior in a daily log of student behavior. The log began on the first day of instruction with students and continued until the last day. The observations of negative student behavior and its consequences were listed in the log, along with the date and the students’ names.

In addition to *Integrating Character Education Program into the Curriculum: Grades 9-12*, and teacher observation, the researcher also used personal reflections from students throughout the study. Students were often asked to analyze their performance as a student, reflect upon their behavior, and set goals for themselves throughout the study. The researcher used these writing responses to chart student progress.

**Procedure**

The model chosen to implement as a character education program was *Integrating Character Education Program into the Curriculum: Grades 9-12*, which was originally created for Richland One School District in Columbia, South Carolina. The model identified 10 character traits that were most important among administrators, teachers, parents, students, and community members in the district. Within the guide, character education standards are meticulously aligned to the existing academic standards; the character standards highlight the 10 traits as identified by the district.

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Results

Data was collected at the beginning of the study. The teacher averaged the students’ grades to determine the academic growth throughout the study. At the end of the third quarter, 17% of students had an A average, while 31% had a B, 36% had a C, 14% had a D average, and a mere 2% was not passing the class (Table 1 and Figure 1). While the students’ academic progress was not atypical of this specific population, there was room for improvement. At the beginning of the study, students were asked to reflect on their performance and set goals for the future (Appendix A). After a discussion about character, most students indicated that they would like to increase their current average by improving their behavior. The teacher then continued discussion of character that was aligned with the standards created for students enrolled in English IV, or British Literature (Appendices B and C). Students completed the study by writing a reflection about which traits were positive in achieving their goals (Appendix D). Most were able to take responsibility for mistakes in character throughout the semester; students also indicated that they mostly learned about how to take responsibility for their actions throughout the semester.

Table 1: Letter Grade Percentages: Quarter 3 versus Quarter 4

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>B</td>
<td>31%</td>
<td>40%</td>
</tr>
<tr>
<td>C</td>
<td>36%</td>
<td>38%</td>
</tr>
<tr>
<td>D</td>
<td>14%</td>
<td>5%</td>
</tr>
<tr>
<td>F</td>
<td>2%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Students responded positively to the study, in both academics and overall character. Students were able to recognize positive and negative character traits such as responsibility, good citizenship, and cooperation in characters in literature and apply what they recognized to their own lives. At the culmination of the study, the percentage of A averages remained the same; however, there was an increase in B and C averages, and a decrease in D and failing grades (Table 1 and Figure 1). Overall, 62% of students improved their class average, and saw an increase in their average within a positive range of 1-10 points, while only 29% experienced a decrease in their class average for the fourth quarter within a negative range of 10. Four students maintained their third quarter average, and saw neither an increase nor decrease in their grade. There were no students failing at the end of the study. Of the students who improved their class average, 42% increased their average by a full letter grade.

In addition, students also worked towards academic goals throughout the semester. Of the 42 students, 62% met all goals, 14% partially met their goals, and 24% did not meet their goals. There were also fewer discipline disruptions, according to researcher observation, as students adapted to the atmosphere of the classroom.
Discussion

While only 42% of students increased their grade by a full letter grade, over 62% of all students improved their overall average. The study was most positive because the character education standards were meticulously aligned with the curriculum, which prevented isolated discussions of character that had no connection to the objectives of the course. The researcher was able to use student descriptions of the 10 character traits as a point of reference for students when their behavior did not match the expectations of the classroom. In addition, students were able to evaluate their own character by reading the selected pieces of literature, which added a deeper connection to the literature in the prescribed curriculum.

The study was also positive because of the level of commitment from the researcher. The researcher spent time closely monitoring student progress through personal conferences and/or through the telephone. Every other week, the teacher had individual conferences with the student to show his/her average. The researcher also reminded students of their personal and academic goals to help keep students moving in a positive direction. The researcher was able to connect with each student on a deeper level, which helped improve his/her character and drive to succeed.

While the results of the study were undoubtedly positive, not every student increased his/her academic performance throughout the 45-day study. In fact, 12 students saw a decrease in their class average. The greatest factor for a negative class average was attendance. Of the 12 students who did not increase their grades, one student failed the course because of absences; however, others had missed two or more days of school during the study. In addition, one student who experienced a decline in her grade had to complete her requirements for graduation in 40 hours of homebound instruction, which were provided by the researcher.

There were also underlying factors that may have positively affected the results of the study that did not directly correlate to the study of character education. The greatest factor was the time period in which the study was completed. The participants in the study were in their final 45 days of school in their senior year. Therefore, students may have been more motivated to perform academically because their graduation would have been negatively affected by poor grades. Although there were discussions about character between the researcher and the student, visual representation of grades may have influenced student performance more than character development.

There are several suggestions for appropriate implementation of a character education program to high school students. First, this study only implemented the character education curriculum with 42 students in the school, and by only one instructor. It is important, however, that ideas learned in one class are applicable and consistent in another, and that the environment is consistent in each class; therefore, to influence academics at a greater level, multiple classes and/or instructors should focus on a character education curriculum. A character education program would be most effective in an entire school setting; however, complete commitment of faculty and staff is of importance. It is important that the school or teacher implementing a character education program fully commit to the program to achieve positive results. Second, timing of the study is important. Since this study took place during the last 45 instructional days for students, the results may have been skewed. It is suggested that the instructor of a character education program begin character education on the first day of instruction and
work to establish and maintain an overall environment that is dedicated to improving both academics and character. The results may have been even more positive had the entire school participated in such a program. Finally, since this study was limited to a senior English class, various instructional tools and methods may need to be modified to meet the needs of individual instructors, levels of students, and desired discipline. Character education programs beginning in the ninth grade and culminating in the twelfth would be ideal.

References


Appendix A

Mid Term Reflection
In a well thought-out and planned essay, complete three paragraphs according to your performance for the first nine weeks of this class:

Paragraph 1: Discuss what you believe that you should be learning in this class according to the instruction you have received and according to the paradigms of school. Describing that you do not think you should be learning anything will not be taken into consideration. Also, describe if you think you are learning what the teacher is hoping to teach.

Paragraph 2: Why, in your opinion, do you think your grade is the way it is in this class? Do you think you have improved as a student since you have started this class? If not, please describe how you can improve by the end of the semester?

Paragraph 3: Provide one personal goal and two academic goals that you’d like to achieve in the final nine weeks of school. Please describe how you plan to reach your goals.

Your reflection will be graded based on thoughtful comments and appropriate use of Standard American English. You can earn extra credit on your evaluation if you type your response.
Appendix B

The Tragedy of Macbeth

Final Reflection

Directions: Using what you have learned about the events in The Tragedy of Macbeth, describe Macbeth’s character throughout the play. Also, reflect on what you can learn about yourself from reading this play.

Paragraph 1: Describe what the word responsibility means to you. Also, describe why responsibility is an important trait to have as a good citizen.

Paragraph 2: Describe how Macbeth does/does not fulfill his responsibility as a good citizen.

Paragraph 3: Describe what you have learned about responsibility from reading The Tragedy of Macbeth. How can you apply what you have learned to your life?
Appendix C

Meditation 17

Cooperation

Directions: Read Meditation 17, and describe how Donne’s idea is a message about cooperation.

Paragraph 1: Summarize the main point or message in Donne’s Meditation 17. Use at least one quotation to support your answer.

Paragraph 2: What can you learn about cooperation from reading Donne’s Meditation 17?
Appendix D

Final Written Reflection

To culminate your experience with the Lewisville High School, complete an essay that evaluates your experience throughout the semester. This reflection will help your teacher enhance learning for future classes as well as help future students. Use the following directions to evaluate the purpose of English IV as well as your experience:

- Paragraph 1: In the introductory paragraph, you should state what you believe the purpose of Senior English is.
- Paragraph 2: Describe in detail some of the successes you have had throughout the semester. Please also describe what advice you would give other students to experience the same success.
- Paragraph 3: Describe in detail some of the challenges you have had throughout the semester. Also, describe what you would change if you had to re-do this semester.
- Paragraph 4: Describe in detail some suggestions you would make to your teacher to enhance the semester for future students.

Each paragraph should be a minimum of five to seven sentences. Your essay will be evaluated based on positive, honest evaluation of the project.
Effect of Behavioral Strategies on Academic Achievement in a Math/Science Classroom

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Columbia College

Abstract
In this study, the behavior and academic success of a fifth grade math/science class was investigated. It was to be determined that specific behavior strategies would make an impact on the overall achievement of the class. The strategies of specific praise, self evaluations, and behavior conferencing were studied for 10 weeks. The results of the study suggest that there was an improvement of the class’ academic success. There were definite improvements in the academics the divergent/behaviorally challenged students of the classroom. In addition, a drastic reduction in class disruptions was also observed. The implications of the study offer suggestions for improving behavior for students who do not abide by typical classroom behavior expectations.

Any school teacher knows that the misbehavior of a few students can cause interruptions that could contribute to the decline of academic success for all members of a classroom. It is of utmost importance to have a learning environment in which every student feels respected, encouraged, and motivated. Misconduct can damage this needed environment even when reprimands are directed at specific students. Inappropriate behavior may occur for any number of reasons including seeking attention, emotional and behavioral disorders, and genuine ignorance of socially accepted behavior. Being able to identify the stimuli for misconduct is imperative to finding strategies to rectify such conduct. Praise and positive reinforcement have been found to provide motivation for students who are lacking in areas such as self esteem or who have a negative self worth. A self-monitoring strategy for appropriate behavior promotes self-awareness and recognition of a student’s actions. Targeted interventions have been found to create positive results in the behavior of unruly students who do not respond positively to the classroom expectations. This study focuses on the use of these strategies in an effort to increase the academic success of the entire classroom population.

Literature Review
Discipline is a large component of education. If the teacher is unable to maintain discipline in the classroom, the teaching and learning process cannot be successful (Erden & Wolfgang, 2004). Problem behaviors such as disruption, disrespect, and aggression or fighting are the most recurring reasons for disciplinary action in elementary schools. These actions are examples of misbehaviors that teachers find most disturbing (Algozzine, Christian, Marr, McClanahan & White, 2008). Behavior problems of students may stem from many stimuli and each has the potential to be modified to enable the students to academic success. “The challenge of maintaining order intensifies with teachers’ concerns about the growing inclusion of students with emotional and behavioral...
problems in general education classrooms and the general levels of diversity in America’s schools” (Algozzine et al., 2008, p. 93).

All students should be treated equally, receive instruction that is appropriate and sensitive to their ability levels, and be given positive reinforcement for academic and behavioral accomplishments (Bierbaum, Henrich, & Zigler, 2005). “Praise has been widely recommended as an important reinforcement method for teachers because it can build self-esteem, provide encouragement, and build a close relationship between student and teacher” (Burnett, 2002, p. 7). Burnett found that feedback that encourages effort, i.e., you’re working very hard, is favored by more students than feedback which fosters ability, i.e., you are a smart student. Creating positive exchanges with students promotes a learning environment that encourages proper academic and social conduct and consistently recognizes and reinforces those behaviors (Partin, Robertson, Maggin, Oliver, & Wehby, 2010).

“Students with ADHD exhibit behaviors that, left unchecked, can negatively influence their ability to meet the academic, behavioral, and social demands of the school setting” (Stahr, Cushing, Lane, & Fox, 2006, p. 209). Such students could benefit from learning self-regulation and self-reinforcement strategies to improve impulsivity and poor social skills. Self-monitoring interventions have the potential to create an increase in on-task behaviors and completion of work. It also may decrease classroom disturbances in a variety of students including students with emotional and behavioral disorders (Rock, 2005; Stahr et al., 2006).

Teachers must teach students how to execute behavioral expectations (Erden & Wolfgang, 2004). Students who do not respond to the expectations may benefit from efficient, targeted interventions. Such students may demonstrate inadequate peer relations, poor academic achievement, and/or chaotic home environments. Aggressive and submissive-rejected children demonstrate “antisocial changes in their goals, including the increased desire to retaliate” (Troop-Gordon & Asher, 2005, p. 568). These students should be taught a combination of conflict resolution strategies to build a repertoire of socially acceptable behavior and usually need more practice in learning behavioral expectations (Hawken & Horner, 2003).

Increasing chances to earn rewards, positive feedback, and knowledge and practice of behavior expectations have “powerful behavioral effects” (Nowacek & Mamlin, 2007, p. 29). These strategies, along with other teaching techniques, may be effective in creating favorable classroom environments, promoting positive student teacher relationships, and generating academic achievement in more students overall.
Methods

Participants
The class participating in this study included a total of 18 5th graders from a wide range of socioeconomic strata. It consisted of 5 black females, 2 black males, 7 white females, and 4 white males. Eight students received free/reduced lunch. Living arrangements of students also varied. Eight lived in single parent homes, 7 lived with both parents, and 3 lived in foster/nontraditional homes. The academic levels of the students in the class differed. Five of the students had academic improvement plans in the math content area due to their past scores on standardized testing. Three students performed at high levels even though none of them had been labeled as gifted and talented. Three students were ranked divergent using the Divergence Ranking Guide prior to the research period (Appendix A). One student had ADHD and another wore a heart monitor due to open heart surgery at a younger age.

Materials
During this study, several methods of data collection were used. Baseline and strategy implementation data were collected using weekly charts from the school’s positive behavior incentive system (Appendix B), academic progress reports, and audio recordings. Weekly self-evaluations were completed by class members (Appendix C). For those who needed additional interventions to improve behavior, weekly conferences were held and record sheets were kept to follow the success of such conferences.

Procedures
During the gathering of baseline data, no new strategies were implemented. The behavior tracking system used by the school provided a preliminary look into the interruptions in the classroom. In addition to this, weekly math quizzes and quarterly progress reports provided a baseline for the academic data of individual students. Finally, audio recordings of instructional time provided an accurate tracking of specific praise during the research period. After baseline data were collected, the implementation of behavioral strategies began.

Several strategies were used to record and track unwanted and desired behavior of 5th graders in a math/science class. The first strategy implemented was praise for desired behavior. Students received more specific praise than given in the past based on Burnett’s (2002) data that positive feedback encourages success academically and behaviorally. A tally of positive feedback was kept on each student to ensure all participants received comparable amounts of praise during the data collection period. Due to the school wide discipline policy of a PBIS program, the behavior charts continued to be a measurement of success. The second strategy was to have students critique their own behavior through self monitoring. Students completed weekly self-evaluations on academics and behavior in order for them to recognize the connections between the two. Postcards were sent home to share behavioral successes with caregivers. A bulletin board was created as a celebratory display of success for the students. The postcards and the bulletin board were used in an effort to motivate students by recognizing positive behaviors. A third strategy used targeted intervention with students who did not respond to the other strategies positively. These students participated in weekly behavior conferences which provided conflict resolution strategies. Record sheets
were kept in an effort to demonstrate success of this strategy. After 5 weeks, the data were compared to the baseline information. The academic improvement was measured by students’ report card grades.

Results

Class averages of math and science grades showed that the students’ grades did increase during the strategy implementation period. The three students labeled as divergent in the classroom increased in one if not both of their subject areas (Tables 1 & 2). Specifically, the weekly math quizzes showed an increase for the entire class (Table 3). Significant increases for two of the divergent learners are evident (Table 4).

Table 1: Math Interim and 3rd Quarter Final Grades

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<th>Students</th>
<th>Interim</th>
<th>Quarter Grade</th>
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<tbody>
<tr>
<td>Class Average</td>
<td>84.278</td>
<td>85.55556</td>
</tr>
<tr>
<td>Divergent #1</td>
<td>74</td>
<td>72</td>
</tr>
<tr>
<td>Divergent #2</td>
<td>86</td>
<td>91</td>
</tr>
<tr>
<td>Divergent #3</td>
<td>56</td>
<td>59</td>
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</table>

Table 2: Science Interim and 3rd Quarter Final Grades

<table>
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<td>85.2222</td>
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<td>76</td>
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<td>Divergent #2</td>
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<tr>
<td>Divergent #3</td>
<td>55</td>
<td>76</td>
</tr>
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</table>
Table 3: Weekly Math Quiz Scores-Class Average

<table>
<thead>
<tr>
<th>Week</th>
<th>DL1</th>
<th>DL2</th>
<th>DL3</th>
<th>Class Average</th>
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<tbody>
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<td>WK 2</td>
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<td>WK 3</td>
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<td>WK 8</td>
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<td>WK 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WK 10</td>
<td></td>
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</table>

Weekly Math Quiz Scores-Divergent Learners
On the behavior charts that were kept throughout the research, an increase of behavioral incidents is reported for the class as a whole. In areas of class disruption, which include talking, playing, bothering others, out of seat, and interrupting lesson, the entire class displayed an increase of incidents in the second five weeks (Table 5). For the three divergent learners, who coincidentally participated in the behavior conferences, the disruption tallies decreased along with office referrals and not completing work (Table 6). Through daily recordings of the class period, specific praise was tallied during the 10 week period (Table 7). The average amount of specific praise given to students increased during the second 5 weeks of the study. The amount of specific praise given to the divergent learners at least doubled during the implementation period.
Table 5: PBIS Class Results

*Class Disruptions includes talking, playing, interrupting lessons, not following instructions, and out of seat.
*Not completing work includes homework and class work.
Table 6: PBIS Divergent Learner Results

<table>
<thead>
<tr>
<th></th>
<th>1st 5 wks</th>
<th>2nd 5 wks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Disruptions</td>
<td>44</td>
<td>37</td>
</tr>
<tr>
<td>Not Completing Work</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Office Referrals</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Class Disruptions includes talking, playing, interrupting lessons, not following instructions, and out of seat.
*Not completing work includes homework and class work.
Table 7: Specific Praise Results

![Table 7: Specific Praise Results](image)

**Discussion**

Some of the data showed an increase in the behavior incidents of the class as a whole, but there were significant decreases in misbehavior occurrences among the three students labeled as divergent learners in the class. These students also happened to be the main causes of behavior problems in the class during the baseline period. They participated in weekly behavior conferences. Their specific praise was increased, and there is a definite decrease in their misbehavior incidents as well as an increase in their academic achievement. Such information could demonstrate that these behavior strategies, though not proven to be successful on all students, can assist in the success of divergent learners or students who exhibit behavior problems in the classroom.

Some data from one student in particular did not display the expected outcome of the research. One of the divergent learners, whose grades did improve overall, did not improve on the weekly quizzes. This student, who has ADHD, was undergoing a trial period for new medication. Also, another variable for this research was the time frame in which it was performed. The last week of data collection fell the week before spring break vacation. Student excitement was evident during this week and perhaps could have affected the outcome of the research.
References
**Appendix A**

**Divergence Ranking Guide**
Taylor/Johnson 1999

Consider the subject on each polarity individually.
If the subject is more like the description on the left, score a -1 for that polarity.
If the subject is more like the description on the right, score a +1.
If you are undecided, score a 0.
Total the scores and enter the result by “TOTAL SCORE” at the bottom of the page.
For example, if you have ten +1s, five -1s, and four 0s, the total score will be +5 (10-5+0=5).

<table>
<thead>
<tr>
<th>Traditional Learner</th>
<th>Divergent Learner</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Score -1 for each of these:</strong></td>
<td><strong>Score +1 for each of these:</strong></td>
</tr>
<tr>
<td>The subject:</td>
<td>The subject:</td>
</tr>
<tr>
<td>finds importance in details.</td>
<td>finds importance in wholes or large chunks of in-context information.</td>
</tr>
<tr>
<td>values facts.</td>
<td>values people’s opinions/feelings.</td>
</tr>
<tr>
<td>processes in sequence.</td>
<td>processes holistically.</td>
</tr>
<tr>
<td>stores data in order without context.</td>
<td>stores data in big piles.</td>
</tr>
<tr>
<td>finds data quickly.</td>
<td>requires longer processing.</td>
</tr>
<tr>
<td>separates information from personality.</td>
<td>cannot learn from persons whom he/she dislikes.</td>
</tr>
<tr>
<td>is rule driven.</td>
<td>is indulgent and expedient.</td>
</tr>
<tr>
<td>likes planning and preparation.</td>
<td>likes spontaneity and surprise.</td>
</tr>
<tr>
<td>likes rehearsal.</td>
<td>dislikes repetitive practice.</td>
</tr>
<tr>
<td>likes predictable answers.</td>
<td>likes creative answers.</td>
</tr>
<tr>
<td>takes a “serious” approach.</td>
<td>likes humor and levity.</td>
</tr>
<tr>
<td>delays action while preparing.</td>
<td>wants action first.</td>
</tr>
<tr>
<td>learns in quiet context.</td>
<td>needs accompaniment/music, etc.</td>
</tr>
<tr>
<td>wants structured environment.</td>
<td>wants relaxed informal setting.</td>
</tr>
<tr>
<td>likes competition in the classroom.</td>
<td>avoids competition.</td>
</tr>
<tr>
<td>is controlled, organized.</td>
<td>is messy.</td>
</tr>
<tr>
<td>is impersonal.</td>
<td>is warm, outgoing.</td>
</tr>
<tr>
<td>works alone.</td>
<td>wants group work.</td>
</tr>
<tr>
<td>is reflective.</td>
<td>is impulsive.</td>
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</table>

**TOTAL SCORE**
### Appendix B

Positive Behavior Incentive System (PBIS) Chart

<table>
<thead>
<tr>
<th>Name</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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</table>
Appendix C

Self-Evaluation Sheet

<table>
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<tr>
<th>On Target</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong></td>
</tr>
<tr>
<td><strong>Date:</strong></td>
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</table>

<table>
<thead>
<tr>
<th><strong>Target Behavior:</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Monday</strong></td>
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<tr>
<td><strong>Tuesday</strong></td>
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<tr>
<td><strong>Wednesday</strong></td>
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<tr>
<td><strong>Thursday</strong></td>
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<tr>
<td><strong>Friday</strong></td>
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