Article

Using Stress Balls to Focus the Attention of Sixth-Grade Learners

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Abstract: *This pilot study investigated the effects of allowing sixth-grade students in a rural south Georgia school to use stress balls during direct instruction and independent practice. Data from learning style inventories, surveys, journals, teacher observations, and formal assessments were collected for 29 sixth-grade students in a language arts class. Students were videotaped and observed for three weeks before the intervention and for seven weeks when they used the stress balls. The frequency of distraction incidents decreased during both direct instruction and independent practice when students used stress balls. Kinesthetic learners used the stress balls more consistently and their attention spans increased more when compared to other learners. Student achievement on writing paragraphs improved. Based on journal entries, all types of learners thought that their attitude, attention, writing abilities, and peer interaction improved due to stress ball use.*

Introduction

Developing a supportive classroom environment where a large number of adolescents can focus their attention on instruction without excessive distractions is a constant challenge for teachers. Some students create disturbances by attending to their own needs for movement, distracting other students, and compromising the learning environment (Carbone, 2001). Students who create management challenges include, but are not limited to, those who have Attention Deficit Hyperactivity Disorder (ADHD). Many middle-grades students have a short attention span. They may pay little attention to details, make careless mistakes, not listen when spoken to directly, not follow instructions, fail to finish tasks, have difficulty organizing tasks, avoid tasks that require sustained mental effort, lose things, or be forgetful.

Attention and learning go hand in hand. Mayes, Calhoun, and Crowell (2000) found learning disabilities in math (numerical operations) and reading (reading comprehension) were more prevalent among children with ADHD, and problems with written expression were twice as common. Even 7-year old children who were inattentive without being overactive and impulsive were more likely to have general cognitive delays, particularly in language development (Warner-Rogers, Taylor, Taylor, & Sandberg, 2000).

Although having a short attention span has a substantial impact on an individual student's engagement, productivity, and learning, it does not necessarily compromise the learning environment for other students. Hyperactive and impulsive behaviors (American Psychiatric Association, 1994), however, are more likely to adversely impact the ability of other students to concentrate on learning. Students may exhibit sensory defensiveness, responding to certain harmless situations as if they were dangerous or painful and become angry when they are forced to comply with classroom expectations (Ward, n.d.). Impulsive and uncontrolled behaviors disrupt the learning environment in the classroom. It is difficult for teachers and students alike to ignore a hyperactive student who fidgets, squirms in the seat, moves around the classroom at inappropriate times, has difficulty working quietly in groups, and talks excessively. It is also a challenge for teachers to encourage oral contributions from shy and quiet students while discouraging impulsive behavior of students who blurt out answers, interrupt others, and refuse to wait their turn. Disruptive behavior interferes with teachers' ability to differentiate instruction and includes children with disabilities (Mitchem & Downing, 2005).

Students who take more than their share of the teacher's time and who constantly disrupt instruction are often resented and rejected by their classmates (Stevens, 1997; van Lier, Muthén, van der Sar, & Crijnen, 2004). Corrections and punishments result in a negative spiral of increasingly inappropriate behavior. Establishing positive relationships with teachers and peers is very important in the prevention and management of disruptive behavior (Mitchem & Downing, 2005; van Lier et al., 2004). Any management strategies that make it possible for these students to function effectively without distracting other students will reduce their sense of isolation and rejection by their classmates.

Due to the difficulty students with ADHD have making and keeping friends, effective behavior strategies should be taught so that social interaction can be strengthened (Buchoff, 1990). In order for students with ADHD to be successful in school, they should be taught effective strategies that focus on learning (Salend & Rohena, 2003) and produce positive social interactions.

Although children with ADHD have long been treated with stimulant medication, physicians believe that both parents and schools overrefer children for ADHD (HaileMariam, Bradley-Johnson, & Johnson, 2002). Instead they recommend behavior management at home and school. Recommendations for effectively managing behavior problems in the classroom often focus on improving students' executive functioning by teaching intrinsic strategies for self-monitoring and self-controlling their behavior (Traynor, 2002). For instance, Ardoin and Martens (2004) found that self-evaluation combined with accuracy training decreased the disruptive behavior of four students with ADHD. Shukla-Mehta and Albin (2003) described specific practical strategies to prevent behavioral escalation in classroom settings. In addition to common sense suggestions for teachers, several recommendations focus on encouraging students to take more responsibility for their own behavior. These include the importance of offering students opportunities to display responsible behavior, teaching them socially appropriate behavior to replace problem behavior, teaching them survival skills that will increase success, and helping them understand the triggers for their problem behavior.

Students' learning styles affect their attention, behavior, and academic performance (Pyryt, Sandals, & Begoray, 1998). Although students with ADHD encompass all of the learning styles, kinesthetic learners with ADHD have substantial problems with attention span (Mayes et al., 2000). This is not surprising because they have a strong need for stimulation and movement and often appear to be driven by a motor (Carbone, 2001). Kinesthetic learners also have a very strong need to move while they learn; they are often highly successful in drawing and activities that require movement (Salend & Rohena, 2003). When these students beat or drum on their desks and move excessively, they interfere with the attention of auditory and visual learners. The visual learners need to be able to concentrate to visualize concepts in their minds. They seem to learn best from demonstrations and graphic organizers. The auditory learners need to listen to explanations without interruption and talk to each other without distractions as they construct understanding and solve problems (Brain Power, n.d.). Kinesthetic students need to be able to move and at the same time be quiet, focus on instruction, and not distract others (Pica, 1998). It is these two seemingly contradictory needs that make these behaviors so difficult for a teacher to address effectively.

In a single class taught by one of the authors (Stalvey), a sixth-grade language arts teacher, several students exhibited frequent and intensely distracting behaviors. Recommended strategies for effective classroom management (Hallowell, 1992), such as giving additional attention, using frequent eye contact, ignoring the misbehavior, providing correction for negative behaviors, providing praise for on-task behavior, and providing increased structure and frequent reminders, were unsuccessful in reducing distractions. In five minutes, one student exhibited 17 off-task behaviors, such as repeated facial tics, changes in body language, getting out of the seat, playing with hair or other objects, beating on the desks, and making vocalizations. However, when he was given a stress ball to manipulate, he appeared to maintain better focus on the lesson and to participate appropriately in class discussion.

This experience was intriguing. Would stress ball use affect not only kinesthetic students, but also other students in the classroom? As this research began, Dr. Shepard, a professor at Thomas University, shared two anecdotes of very positive stress ball experiences (personal communication, Oct. 17, 2003). In both situations, the students chose the stress ball and used it continuously. In one case, a teacher was skeptical about allowing a student to use a stress ball during a test. She took the ball away from the student, and the student was upset and told the teacher, "I listen better when I am holding my ball." The teacher allowed the student to hold the ball while completing the test, and to her amazement the score was the highest the student had earned the whole year. In another case, the other students in the classroom made sure the student who needed the stress ball was encouraged to use it. They recognized a positive change in behavior when the student used the stress ball during direct instruction (Shepard, personal communication, Oct. 17, 2003).

These classroom observations were initially surprising because many guidelines for modifying instruction for students with ADHD include suggestions for creating a stimuli-reduced environment (Georgia Department of Education, 2002) and avoiding overstimulation (Hallowell, 1992). However, some research findings may provide some explanation. Majorek, Tuchelmann, and Heusser (2004) found that children with ADHD, provided with movement therapy, improved motor development, concentration ability, and attention. In a different study on the effects of finger movement on brain stimulation, the amount of stimulation increased when students chose to move their fingers themselves (Thickbroom, Byrnes, & Mastaglia, 2003).

In addition to enabling constructive and complementary connections between movement and cognition, the physical exercise may be effective in itself. Hallowell (1992) claimed that one of the best treatments for ADHD is exercise, preferably vigorous exercise. He suggested that exercise helps work off excess energy, helps focus attention, and stimulates production of certain hormones and neurochemicals that are beneficial. Although classroom teachers cannot often allow vigorous exercise during instruction, manipulating a stress ball may function as an escape valve for the need to move. A similar effect can be observed with computers, which offer a powerful aid to overcoming distractions and short attention span (Stevens, 1997). In addition to providing visual stimulation, computers offer students tactile and kinesthetic participation that triggers "hyperfocus" mechanisms: students become totally absorbed in whatever activity is on the screen.

It is important to control distractions in the learning environment for students with ADHD, but this does not necessarily mean reducing stimuli. Some researchers have found that appropriate music can help students concentrate. Stevens (1997) described a student who was able to concentrate on easy, routine worksheets only when he had loud rock music playing through his headset. The music provided him with a sense of isolation. However, if the task involved higher-level processing, the rock music drowned out his mental processing. Instead, soft, repetitive music, such as sounds of nature, helped him to focus his attention. Thus, the recommendations might be interpreted

by the classroom teacher to indicate that they should reduce stimuli in the external, peripheral environment. However, other personalized and task-oriented stimuli may provide an attention-funneling mechanism, increasing on-task engagement.

Using stress balls may also help students to develop some control over their own behavior. Elementary children with behavior problems pay attention and learn more effectively when they have increased opportunities to respond verbally (Sutherland, Alder, & Gunter, 2003) and participate with written responses (Lambert, Cartledge, Heward, & Lo, 2006). By providing students with an appropriate method of coping with fidgety and impulsive behavior, the teacher is reinforcing calm on-task behavior, teaching the students socially appropriate and responsible behaviors to replace the problem behavior, and helping students to recognize triggers in time to divert their disruptive behavior (Shukla-Mehta & Albin, 2003). By learning such survival skills, the students are more likely to focus their attention in class and develop more positive relations with peers and teachers.

The language arts teacher has a great responsibility to help students build a strong writing foundation for lifelong learning. Teachers need to provide effective learning environments so that students can pay attention and focus on instruction in order to achieve their learning goals. This pilot study describes the effect of stress ball use on attention span, writing scores, and student attitudes toward task completion. There were three research questions.

Research Question 1. What is the effect of stress ball use on the attention span and distraction level of auditory, kinesthetic, and visual learners during direct instruction and independent practice?

Research Question 2. What is the effect of stress ball use on writing scores?

Research Question 3. What is the effect of stress ball use on students' attitudes towards task completion and to interactions with their peers?

Methods

Setting and Participants

The research took place in the only middle school in the rural South Georgia community. The 1,400 students in grades six through eight were grouped together on teams or clusters in order to encourage a "family" type atmosphere. The racial/ethnic composition of the school consisted of 62% White, 35% Black, 2% Hispanic, and 1% other. Many of the students came from fairly low socioeconomic backgrounds, with 58% qualifying for free/reduced lunch.

The sixth-grade language arts class used for this study contained 29 students–16 females and 13 males. This class was the second highest ability level on the team according to the performance on the Criterion Reference Competency Test (CRCT) math scores. According to their CRCT scores (Table 1), most of the students were average to strong academically, but not outstanding.

Students completed the *Peak Performance: Learning Style Inventory* (Peak Performance, n.d.), consisting of 14 items with a multiple-choice sentence completion format. According to this inventory, students' learning styles were varied: 6 visual, 4 auditory, 15 kinesthetic, 1 visual/auditory, 2 visual/kinesthetic, and 1 auditory/kinesthetic. Several students had obvious attention problems although only one had been medically diagnosed with ADHD. The students who were academically stronger were mainly auditory or visual learners (Table 2). The kinesthetic students exhibited lower grades for the class due to missing assignments and incomplete class work including notebooks. When compared to the whole group, the kinesthetic learners were weaker

Table 1

Spring 2002 CRCT Scores: Number of Students at Each Performance Level of CRCT Test Categories

CRCT Level	CRCT Category		
	Reading	Language Arts	Math
Exceeds standards	9	4	0
Meets standards	18	21	27
Does not meet standards	2	4	2

Table 2

Learning Styles Comparison With Grades

Type of Learning Style	Number of Students	Average Grade for Completed Homework (%)	Average Grade for Completed Notebook (%)	First 9 Weeks Language Arts Grade (%)
Auditory	4	86	83	90
Kinesthetic	15	73	80	83
Visual	6	93	94	95
Visual/ Kinesthetic	2	90	98	94
Visual/ Auditory	1	15	33	71
Auditory/ Kinesthetic	1	100	94	94

in completed homework and notebook organization. The student with a mixture of visual and auditory learning style and who had the lowest grade in the class was diagnosed with ADHD.

Students also completed a *Knowing the Learner Inventory* (KTL) (Gregory & Chapman, 2002) consisting of five multiple-choice and five free-response items that measure specific learning preferences. Interesting patterns emerged when these learning preferences were compared with learning styles (Table 3). Nearly all of the kinesthetic learners liked to work with music and preferred to learn something new by either demonstration or by trying it themselves. Most of them liked to work on computers and preferred sitting around the edge of the classroom, whereas visual and auditory learners were more

Table 3

Comparison of Responses to KTL Inventory Questions with Learning Styles

KTL Questions	Learning Styles						
	All	V	A	K	A/V	A/K	V/K
1. Study preference							
Quiet place	9	6	0	1	0	1	1
Music on	20	0	4	14	1	0	1
2. Work place preference							
In the classroom	0	0	0	0	0	0	0
On the floor	7	3	3	0	0	0	1
At the computer	10	1	0	9	0	1	0
At a desk (at home)	11	2	1	5	1	0	1
At a table	1	0	0	1	0	0	0
3. Class work not complete because							
You forgot	5	1	2	1	0	0	1
You were distracted	6	3	0	2	0	0	0
It was boring	4	0	0	4	0	0	0
You needed help	14	2	2	8	1	1	1
4. Class seating preference							
Near the door	1	0	0	1	0	0	0
By the wall	5	1	0	4	0	0	0
Back	8	0	1	4	0	1	1
Front	0	4	2	1	1	0	1
Near a window	6	1	1	4	0	0	0
5. Prefer to work with partner							
Yes	28	5	4	13	1	1	2
No	1	1	0	1	0	0	0
6. Time of day most alert							
Morning	3	1	1	1	0	0	0
Afternoon	4	1	0	3	0	0	0
Evening	22	4	3	10	1	1	2
7. Prefer learning something new by							
Explanation	11	6	1	1	1	0	1
Video/demo	10	0	3	7	0	0	0
Read	1	0	0	0	0	0	1
Try itz	9	0	2	5	0	1	1

Note. Learning Styles are as follows: V = visual, A = auditory, K =- kinesthetic, A/V = auditory/visual, A/K = auditory/kinesthetic, V/K = visual/kinesthetic

likely to prefer sitting at the front of the class. Many of the kinesthetic learners thought they needed extra help from the teacher in order to complete their class work. These patterns are consistent with research on brain function and learning styles (Brain Power, n.d.; Salend & Rohena, 2003).

Intervention

The learning environment was modified by providing a variety of stress balls and encouraging students to use them voluntarily during instruction. Voluntary stimulation was advocated by Thickbroom et al. (2003). On the first day of intervention, all students were allowed to feel and squeeze the stress balls, which had different textures, shapes, and colors. As the stress balls were introduced, some students appeared actually to need the stress balls to pay attention while others just played with them. During the 7-week intervention, students had the opportunity to use the stress balls at least three times each week for 30 minutes each time during writing instruction. Due to other curriculum obligations and class organization needs, 30 minutes was the longest block of time that could be given to writing instruction.

Instruments for Data Collection

The effects of using stress balls on student behavior, writing performance, and attitudes were observed several ways. Throughout the study, there were gaps in the data due to student absences and incomplete survey responses. Data were analyzed only when paired data were available. Wilcoxon Signed Ranks Test for paired data was used for statistical analysis throughout this study. The *Z* scores reported are the sum of signed ranks/square root of the sum of squared ranks. An alpha level of 0.05 for two-sided probabilities using normal approximations was used throughout the study to establish significant differences in the outcomes.

Log of Stress Ball Use

Stress ball use was documented with a log including the frequency of use, the selection of stress balls (colors, shapes, textures), and which students (visual, auditory, kinesthetic) chose to use stress balls. Patterns of use were noted to guide future implementation.

Behavior Checklist

Student behavior during direct instruction and independent practice was recorded on videotape for three weeks before the intervention as well as during the intervention. Before the intervention, three 5-minute video segments were recorded. During the intervention, twelve 5-minute video segments were recorded. In addition, extensive field notes were recorded immediately after instruction to provide records of student achievement, attention, attitude, and peer interaction. During videotaping, the camera was set up on a tripod stand. Due to the room arrangement and student seating, only five students were in view of the camera at any one time. The stand was moved around the room at five-minute intervals so that all students were taped. Five-minute segments of videotape were analyzed using a Behavior Checklist to determine the frequency of different off-task distractions: beating on desks, changes in body language, facial quiver and tics, squirming/moving in desks, playing with hair/objects, and getting out of seat. This checklist was developed by one of the authors (Stalvey) and examined for validity by three peer teacher-researchers. Systematic observations with the checklist were supplemented by teacher observations. Changes in frequency of behavior were identified and compared through the mean, standard deviation, and Wilcoxon Signed Ranks Test for paired data.

Attention Survey

Students and their parents completed a 20-item, alternate-choice Attention Survey adapted from the Parent Survey on Student Attention (Allen, First, Pincus, & Widiger, 1994). Responses to each item were scored as yes = 1 and no = 0. Responses to grouped statements determined perceived levels of student inattention, hyperactivity, and impulsivity. Parents completed the survey one week before the intervention started. Students completed the survey both before and after the intervention. Wilcoxon Signed Ranks Test for paired data was used to compare parent and child perceptions and to compare students' perceptions before and after they used the stress balls.

Distraction Survey

The students self-assessed their concerns about being distracted in the classroom using a Distraction Survey developed by one of the authors (Stalvey) and examined for validity by three peer teacher-researchers. The four items in the survey used a Likert scale ranging from 5 = strongly agree to 1 = strongly disagree. The survey was administered before and after the intervention, and scores were compared using Wilcoxon Signed Ranks Test for paired data.

Paragraph Evaluation Rubric

To evaluate any effects of stress ball use on writing performance, students completed writing samples without the stress ball and then with the stress ball. The writing samples were completed as part of a three-week process of writing a research paper on a selected country. Students wrote five paragraphs in the paper: introduction, three body paragraphs, and a conclusion. Writing samples from two body paragraphs were compared, one paragraph written when students used the stress balls and one written without them. Validity concerns were reduced by collecting samples from similar paragraphs within a few days of instruction. In addition, students were given the same specific directions on how to write paragraphs, topic sentences, details, and closing sentences before each paragraph was written. The Paragraph Evaluation Rubric (Appendix) used to evaluate the writing samples was developed by one of the authors (Stalvey) and had been used by all the Language Arts teachers at the school for several years. It assessed format, clarity, appropriate introduction and conclusion, and mechanics of paragraphs. Pretest and posttest results were compared using Wilcoxon Signed Ranks Test for paired data.

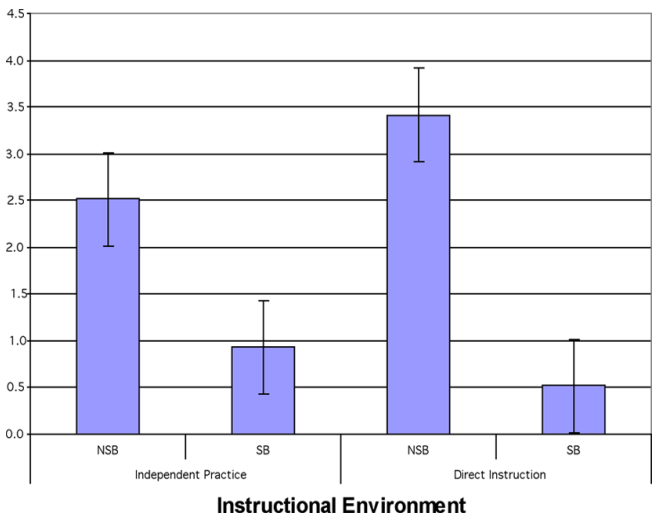
Student Journal Entries

During the intervention period, students wrote five journal entries about their perceptions of their writing achievement, attention span, attitude to writing, and peer interaction. The journal entries were not assessed for a grade. The journal entries were supplemented by a four-item free-response questionnaire on student perceptions of their writing abilities. Emergent themes were identified from the responses.

Results

The first research question was to examine whether using stress balls would improve student behavior as a source of distractions in the classroom. The Behavior Checklist was used to compare frequency and categories of off-task distractions with and without stress ball use during direct instruction and independent practice (Figure 1). In a period of five minutes, the number of distractions for individual students ranged from 0 to 10. The severe ADHD student had the greatest number of occurrences. Kinesthetic learners exhibited more problems than did the visual and auditory learners. There were significantly fewer distractions during stress ball use. During direct instruction, the mean number of distractions for the 29 students visible for each five-minute video recording decreased from 3.4 to 0.5 (Z = -3.988, p = < .01). During independent practice, the mean number of distractions decreased from 2.5 to 0.9 (Z = -2.940, p = < .01). Field notes also showed an increase in student attention and decrease in distractibility.

Figure 1. Number of distraction incidents during 5-minute intervals of direct instruction and independent practice with (SB) and without stress ball (NSB) use. Error bars indicate standard deviations.



Twenty-one out of 29 parents completed the Attention Survey (Table 4). Parents did not discriminate between inattention, hyperactivity, and impulsivity (M = 0.2, SD = 0.3 for each symptom). Four parents said their children exhibited symptoms at home in addition to the school setting. Five parents placed the onset of symptoms of inattention, hyperactivity, and impulsivity before the age of seven. In two cases, students were identified by a parent as easily distracted although they had not been identified by the teacher.

Parent and student perceptions of each student's attention characteristics before the intervention were moderately correlated (Pearson's r = 0.66). Students generally rated themselves higher in inattention, hyperactivity, and impulsivity than did their parents (Table 4). Based on Wilcoxon Signed Ranks Test comparisons, this difference was significant only for the combined scores (Z = 2.331, p = 0.02).

Students' responses to the Attention Survey before and after the intervention were compared. After their experience in using stress balls during instruction, students reported some improvement in their attention characteristics. For each category of symptoms, the scores were lower on the posttest, although this was not significant on the Wilcoxon Signed Ranks Test.

Mean responses to the Distraction Survey are fairly close to neutral (3 on the Likert scale). For the 25 students who completed the survey both before and after the intervention, there were no significant changes on items 1, 3, and 4 (Table 5). The slight increase in scores for item 2 (Z = 2.07, p = 0.04) indicates that students agreed more with the statement "Other students are a distraction to me" after the intervention. It seems probable that a side effect of the study was to make students more conscious of how they are distracted by other students.

The second research question focused on the effect of using stress balls on student achievement. The effect of stress ball use on writing scores was assessed using Paragraph Evaluation Rubric (see Appendix). Twenty-one students wrote paragraphs both before and after the intervention, and these were compared using the Wilcoxon Signed Rank Test. The mean writing score of the class increased from 73% to 83% (Z = 2.54, p = .01). The student with ADHD experienced the most gain with an increase of 27%. This supports findings by Majorek et al. (2004) who found that movement therapy for students with ADHD helped students focus and learn. The auditory group (n = 4) experienced a mean increase of 15% and the visual group (n = 3) mean increase was 10%. Kinesthetic students achieved the least increase in writing achievement with a mean increase of 8%. In their journal writings, most of the students attributed their increased ability to stress ball use.

The third research question examined whether using stress balls would affect students' attitudes towards engagement in instructional activities and learning environment, which are clearly important in influencing learning. Attitudes expressed in student journal entries reflected generally more positive attitudes towards writing and working with their peers. However, when free responses to the writing questionnaires were compared, there was little difference between scored responses related to attention span, attitude, and peer interaction from before and after the intervention. Nineteen of the 29 students agreed that the stress ball helped them write. They indicated that the stress balls "calmed them down" and helped them concentrate better and pay attention. On the other hand, seven students thought the stress ball was a distraction during writing because they were already holding a pencil.

Discussion

The first research question targeted the effect of stress ball use on attention span and distraction level of students. According to the Behavior Checklist, the frequency of distractions decreased when stress balls were used. Data collected from student journals and field notes

Table 4

Responses to Attention Survey (Mean, Standard Deviation, and Probabilities From WIlcoxon Signed Rank (WSR) Test for Paired Data)

Symptoms of ADHD		Pretest		Posttest		WSR Test Probability	
		M	SD	M	SD	Pretest Parent-Student n = 21	Students Pre-Post n = 26
Inattention	Students	0.33	0.29	0.23	0.23		0.10
	Parents	0.18	0.32			0.06	
Hyperactivity	Students	0.37	0.26	0.29	0.25		0.43
	Parents	0.22	0.29			0.07	
Impulsivity	Students	0.34	0.38	0.26	0.34		0.75
	Parents	0.20	0.29			0.13	

Table 5

Student Responses to Distraction Survey (Mean, Standard Deviation, and Probabilities From Wilcoxon Signed Rank (WSR) Test for Paired Data; n = 25)

Survey Items	Pre		Post		*t*-test probability
	M	SD	M	SD	
1. The classroom environment is free of stress.	3.1	1.1	3.4	1.4	0.19
2. Other students distract me.	2.6	1.4	3.4	1.1	0.04
3. Noise causes me to forget what I am doing.	3.0	1.4	3.4	1.3	0.19

helped to justify and explain the success of the intervention. Some of the entries from journals and field notes are listed below:

- "The stress ball helps me with attention and concentration."
- "I don't bit [sic] my nails when I am using the stress ball."
- "My feet don't bother people anymore."
- "The stress ball helps to control my beating [on the desk] habit."
- One student told another student "he sure did need to get a stress ball."
- Students not involved in the study asked to use the stress balls.
- Students participating in the study wanted to take the stress balls and use them in their other classes.

Given the length of the intervention (7 weeks), these observations provide strong evidence that the students' interest in using the stress balls was persistent and not just a novelty effect. Students believed that using the stress balls improved their ability to expend their energy in a socially appropriate activity and to channel their attention in an academically fruitful manner.

The writing section of the School Improvement Plan encouraged teachers to focus on improving students' writing performance. The second research question dealt with the effect of stress ball use on writing scores. According to student journals, the students thought the stress ball helped increase achievement. Some responses are as follows:

- "I think it will help me make better grades."
- "It helps me think of what to write."
- "It helps me do makeup work."
- "I feel like I can ace anything when I have my stress ball."

Scores on the Paragraph Evaluation Rubric increased during the intervention. These results should be interpreted with caution because writing samples were scored by the teacher-researcher without independent scoring. Reliability for these scores has not been established. Nevertheless, it is worth noting that performance improvement was not limited to the skills taught during the intervention. This overall class grade average during the third 9 weeks (during the intervention) increased by 2 % compared with grades for the second 9 weeks. Although this increase may appear to be trivial, historically grades had decreased during this grading period due to heavy emphasis on a research paper.

The third research question addressed the effect of stress ball use on attitude to task and peer interaction. From the student journals, 25 out of 29 students agreed that attitude improved. The students had an opportunity one day to take the stress balls to Science class. They wanted to see if the same positive results would apply to another classroom. The consensus was that the stress balls helped in another subject area. Some of the comments were:

- "I didn't talk as much and the work seemed easy."
- "I was having trouble with my work, and the answer just popped into my head after squeezing the stress ball."
- "The ball helped me stay in my seat. Stress balls rule!" (This comment was made by student #4 who gave me the idea for this research.)

Ten out of 15 students who used the stress balls during group work agreed that stress balls helped peer interaction. Their comments included helping with attention, focus, cooperation, and completion of assignments. They also attributed a significant increase in attitude towards peer interaction to the stress ball intervention. It seems likely that decreasing distractions during instruction served a dual role—reducing resentment towards peers who interfere with the learning environment (Stevens, 1997) and increasing their willingness to work with and share learning experiences with their peers.

- Students preferred round-shaped stress balls. Eight of the 29 students close stress balls with shapes other than round (apple, football, hard hat, duck). Seven students were dissatisfied with the choice of stress ball they had made and were given a chance to select a different ball. Four of these students exchanged irregular shapes for round shapes. The other three students chose a different round ball, where the color or design was different but the shape was the same.

It took two weeks for the students to decide whether the stress ball would benefit them during instruction. The stress balls definitely helped during direct instruction when students were expected to sit still and listen. The variety and frequency of distractions were greater than during independent practice. Not surprisingly, the kinesthetic students experienced more difficulty sitting still because of their need to move. Using the stress ball gave them a way to move that comforted them (Ward, n.d.), without resort to a behavior that distracted their peers. Student behavior in the classroom must foster learning and peer interaction in order for students to succeed in school (Salend & Rohena, 2003).

The results from independent practice showed interesting trends. If the students were working in groups and discussing information, the stress ball helped. If the students were working on a written task, the stress ball was not as effective because they could not write and squeeze the stress ball at the same time. Most students did not use the stress ball very often during independent practice because all assignments were writing tasks and the students were already stimulated with the writing utensils. The students who used the stress ball during peer interaction felt the stress ball helped them in learning focus and completion of assignments. The ability to select their own stress ball was also important to them (Thickbroom et al., 2003). It was interesting, however, that some students said, "Just looking at the stress ball helps me think," or "I know I can do the task if I have my stress ball with me." The stress ball became a "mental crutch" for some students.

Deciding on the most effective procedures to implement the use of stress balls without interfering with focus on classroom instruction took time and energy. The classroom environment was very structured with high expectations for appropriate behavior in order to encourage a calm and cooperative working environment. Appropriate procedures and rules were incorporated and enforced during the intervention. Because the students had a tendency to get very excited and out of control, especially at the beginning of the intervention, there is a strong possibility the intervention would not have worked as well if the classroom management had been less structured.

The whole process was a learning experience for both teacher and students. It was enjoyable, ran smoothly, and produced results that were positive and exciting. The teacher was excited about the intervention and really wanted it to work. The students felt special that their class was chosen to participate in the study. Both of these factors could easily have exaggerated the positive effects of the intervention. However, based on the research, it was reasonable to expect the intervention to be effective.

The implications of this study are as follows:

- Inattention and distractions decreased during both direct instruction and independent practice.
- Writing scores increased during independent practice.

- Students of all learning styles benefited, especially the kinesthetic learners.
- Socially, peer interaction was improved especially for students who were kinesthetic or ADHD.

Part of a teacher's job is to be aware of new interventions that work for students. Teachers are challenged to be aware of student learning characteristics and adapt teaching to meet student needs (Salend, 2001). The positive results achieved in this preliminary study justify future studies to determine whether the effects are generalizable to other teachers, to other grade levels, to other subject areas, and to students from a variety of social, cultural, and academic backgrounds.

References

Allen, F., First, M., Pincus, H., & Widiger, T. (1994). *Quick reference to the diagnostic criteria from DSM-IV.* Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Ardoin, S. P., & Martens, B. K. (2004). Training children to make accurate self-evaluations: Effects on behavior and the quality of self-ratings. *Journal of Behavioral Education, 13*(1), 1-23.

Brain Power. (n.d.). Retrieved October 6, 2003, from http://web.nafcs.k12.in.us/users/brain/brain1

Buchoff, R. (1990). Attention deficit disorder: Help for the classroom teacher. *Childhood Education, 67*(2), 86-90. Retrieved November 3, 2003, from Periodical Abstracts database.

Carbone, E. (2001). Arranging the classroom with an eye (and ear) to students with ADHD. *Teaching Exceptional Children, 34*, 72-81.

Georgia Department of Education. (2002). *Attention deficit/hyperactivity disorder.* Retrieved July 9, 2004, from http://www.glc.k12.ga.us/passwd/trc/ttools/attach/accomm/attdef.doc

Gregory, G., & Chapman, C. (2002) *Differentiated instructional strategies: One size doesn't fit all.* Thousand Oaks, CA: Corwin Press.

HaileMariam, A., Bradley-Johnson, S., & Johnson, C. M. (2002). Pediatricians' preferences for ADHD information from schools. *School Psychology Review, 31*(1), 94-105.

Hallowell, E. M. (1992). *50 tips on classroom management of ADD.* Retrieved July 2, 2004, from http://users.rcn.com/peregrin.enteract/add/50clas.html

Lambert, M. C., Cartledge, G., Heward, W. L., & Lo, Y. (2006). Effects of response cards on disruptive behavior and academic responding during math lessons by fourth-grade urban students. *Journal of Positive Behavior Interventions, 8*(2), 88-99.

Majorek, M., Tuchelmann, T., & Heusser, P. (2004). Therapeutic Eurythmy-movement therapy for children with attention deficit hyperactivity disorder (ADHD): A pilot study. *Complementary Therapies in Nursing and Midwifery, 10*(1), 46-53.

Mayes, S., Calhoun, S., & Crowell, E. (2000). Learning disabilities and ADHD: Overlapping spectrum disorders. *Journal of Learning Disabilities, 33*(5), 417-424. Retrieved November 3, 2003, from Periodical Abstracts database.

Mitchem, K. J., & Downing, J. A. (2005). Be proactive: Including students with challenging behavior in your classroom. *Intervention in School and Clinic, 40*(3), 188-191.

Peak Performance: Student assessment learning styles inventory. (n.d.) Retrieved October 6, 2003, from www.glencoe.com/ps/peak/selfassess/learnstyle/index.html

Pica, R. (1998). Movement and the brain. *Teaching Elementary Physical Education, 9*(6), 18-19.

Pyryt, M., Sandals, L., & Begoray, J. (1998). Learning style preferences of gifted, average-ability, and special needs students: A multivariate perspective. *Journal of Research in Childhood Education, 13*(1), 71-76. Retrieved November 3, 2003, from PeriodicalAbstracts database.

Salend, S., & Rohena, E. (2003). Students with attention deficit disorder: An overview. *Intervention in School & Clinic, 38*(5), 1-11. Retrieved October 6, 2003 from Periodical Abstracts database.

Shukla-Mehta, S., & Albin, R. W. (2003). Twelve practical strategies to prevent escalation in classroom settings. *Clearing House, 77*(2), 50-56.

Stevens, S. H. (1997). *Classroom success for the LD and ADHD child.* Retrieved May 9, 2005, from http://www.ldonline.org/ld_indepth/teaching_techniques/class_manage.html#anchor848364

Sutherland, K. S., Alder, N, & Gunter, P. L. (2003). The effect of varying rates of opportunities to respond to academic requests on the classroom behavior of students with EBD. *Journal of Emotional and Behavioral Disorders, 11*(4), 239-248.

Thickbroom, G., Byrnes, M., & Mastaglia, F. (2003). Dual representation of the hand in the cerebellum: activation with voluntary and passive finger movement. *NeuroImage, 18*(3), 670-674.

Traynor, P. L. (2002). A scientific evaluation of five different strategies teachers use to maintain order. *Education, 122*(3), 493-510.

U.S. Census Bureau (n.d.). *State and county quickfacts.* Retrieved February 21, 2004, from http://quickfacts.census.gov

van Lier, P. A., Muthén, B. O., van der Sar, R. M., & Crijnen, A. A. (2004). Preventing disruptive behavior in elementary schoolchildren: Impact of a universal classroom-based intervention. *Journal of Consulting and Clinical Psychology, 72*(3), 467-478.

Ward, S. (n.d.). *Sensorimotor Connection.* Retrieved October 6, 2003, from http://www.sensorimotor.com/puzzling.htm

Warner-Rogers, J., Taylor, A., Taylor, E., & Sandberg, S. (2000). Inattentive behavior in childhood. *Journal of Learning Disabilities, 33*(6), 520-536.

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Appendix

Paragraph Evaluation Rubric
(1 paragraph)

Student's Name_____Teacher's Name _____
Grade/Course_____ Date _____

Criterion	Score
1. You write a paragraph that is complete and clear. (5 sentences)	5 * 10 *15 * 20
2. You have a topic sentence that draws your reader in.	5 * 10 *15 * 20
3. You present sentences that make sense. Your words paint a picture.	5 * 10 *15 * 20
4. You have a satisfying concluding sentence that makes the paragraph sound complete.	5 * 10 *15 * 20
5.Mechanics/Usage	5 * 10 *15 * 20
TOTAL SCORE	

Error Penalty Chart
(Twenty points are the maximum penalty.)

Type Error	Tally Space	Number of errors		
		3 - 4	5 - 6	7 +
Correct form (name, indent, title, ink, margins)		1	3	5
Spelling (each word, not each occurrence)		1	3	5
Fragment/Run-on		1	3	5
Punctuation		1	3	5
Capitalization		1	3	5
TOTAL PENALTY				