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The Efficacy of Fidget Toys in a School Setting for Children with Attention Difficulties and Hyperactivity

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The Efficacy of Fidget Toys in a School Setting for Children with Attention Difficulties and Hyperactivity

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CERTIFICATE OF APPROVAL

This is to certify that the Thesis of

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Abstract

Objective: The purpose of this study was to examine the effects of fidget toys on attention-to-task and on-task behavior for students with ADHD characteristics in a third-grade classroom. This study also explored the effect of fidget toys on attention-to-task for students without ADHD characteristics.

Method: A single subject AB design was used for three students with confirmed attending difficulties or hyperactivity and sensory processing differences. These students were observed by the researcher during baseline and intervention to determine on-task behavior. All students in the class participated in a measure of attention-to-task during baseline and intervention. During baseline, students were engaged in a typical lesson conducted by the classroom teacher. During intervention, all students in the class were provided with a fidget toy to manipulate while engaged in the lesson.

Results: Statistical analysis could not be conducted due to significant variability in the students' behavior during baseline. Two of the three students observed displayed a mean decrease in off-task behavior during intervention. One of these students displayed a mean increase in attention-to-task. The fidget toys did not affect attention-to-task for the other students in the classroom.

Conclusions: Fidget toys may increase on-task behavior and attention-to-task for some students with ADHD characteristics. Fidget toys may not be effective for students who do not display inattention or hyperactive behavior. More research is needed to isolate the characteristics of students who may benefit from fidget toys and to determine the most effective type of fidget toy for these children.

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Chapter 1: Introduction

According to the CDC, approximately 7% of children have attention deficit hyperactivity disorder, or ADHD (Center for Disease Control and Prevention, 2007). Children with ADHD may be hyperactive, have difficulty paying attention, or both. It is not known what causes ADHD, but genetics, brain anatomy, and brain chemistry are all believed to play a role (Zentall, 2006). There are many treatments available aimed at reducing the symptoms of ADHD, including medication, behavior modification techniques, and special education (Rief, 2005).

It has been speculated that some of the behaviors seen in children with ADHD are due to differences in sensory processing. Optimal stimulation theory posits that "the brain needs stimulation to maintain its integrity and functioning" (Zentall, 2006, p. 50). If the level of stimulation is not "optimal," we change our behavior in order to increase or decrease stimulation (Zentall, 2006, p. 50). According to this theory, children with ADHD are generally understimulated. Hyperactive behavior is an attempt to increase their level of stimulation. According to this theory, ensuring that children with ADHD get "sufficient stimulation" will result in a decrease in hyperactivity (Zentall, 2006, p. 51). According to an optimal stimulation theorist, "teachers can use sound, movement, and interest" to help children with ADHD stay on task (Zentall, 2006, p. 161). A similar theory, sensory integration theory, is used in occupational therapy. Sensory integration (SI) theory states that impairments in the ability to process, integrate, and/or regulate sensory information can affect learning, social interaction, behavior, and general daily function (Ayres, 2005). Occupational therapists using SI theory aim to improve a child's sensory processing by creating an environment that challenges the child's abilities, provides opportunities for multiple forms of sensory experiences, and is enjoyable and play-based. Carryover at home and in the classroom is also emphasized (Schaaf, et al., 2010).

Multiple studies have shown that many children with ADHD process sensory information differently than typical children (e.g. Huecker & Kinnealey, 1998; Mangeot, et al., 2001; Mulligan, 1996; Yochman, Parush, & Ornoy, 2004). For children with differences in sensory processing, occupational therapy using SI techniques has been found to be an effective form of treatment (Miller, Coll, & Schoen, 2007). Occupational therapists sometimes suggest that sensory diets or other sensory based interventions be implemented during the school day for a child with ADHD to help the child remain calm and focused (Gould & Sullivan, 1999). Some sensory techniques, including weighted vests (VandenBerg, 2001), dynamic seating (Pfeiffer, Henry, Miller, & Witherell, 2008; Schilling, Washington, Billingsley, & Deitz, 2003), and physical activity (Azrin, Vinas, & Ehle, 2007), have been studied, while others have not. One frequently recommended (e.g. Gould & Sullivan, 1999; Haack & Haldy, 1998; Rief, 2005) but minimally researched sensory technique for children is the use of fidget toys. Studies are needed to determine the true efficacy of fidget toys for children with ADHD.

Purpose

The purpose of this study is to determine whether fidget toys are effective at increasing on-task behavior and attention to task during a classroom-based listening activity in children with attending difficulties and hyperactivity. This study will also explore the effect of fidget toys on attention to task for children without attention difficulties or hyperactivity.

Chapter 2: Review of Literature

Attention deficit hyperactivity disorder is classified as a neurobehavioral or neurobiological behavioral disorder (Rief, 2005). Some children with ADHD primarily have difficulty maintaining attention (predominantly inattentive type), some are mainly over-active or impulsive (predominantly hyperactive-impulsive type), and some are both inattentive and hyperactive-impulsive (combined type) (Center for Disease Control and Prevention, 2005). Inattentive ADHD is sometimes referred to as attention deficit disorder, or ADD (Reif, 2005). According to the Diagnostic and Statistical Manual of Mental Disorders IV, children with inattentive ADHD have difficulty staying on task (American Psychiatric Association, 2000). They may be distractible, disorganized, and forgetful and may have trouble following directions (American Psychiatric Association, 2000). Children with hyperactive/impulsive ADHD have difficulty staying in one place and controlling their behavior (American Psychiatric Association, 2000). They may fidget, run around, get out of their seats excessively, interrupt others, and have difficulty taking turns (American Psychiatric Association, 2000). These issues often make it difficult for children with ADHD to focus, participate, and learn in a typical classroom environment (Rief, 2005). If appropriate interventions are not in place, students with ADHD can also have a negative impact on the classroom dynamic. Teachers report that working with students with ADHD is more stressful than working with typical students. Teachers also tend to spend more time with students with ADHD, which may be detrimental to the other students (Greene, Beszterczey, Katzenstein, Park, & Goring, 2002).

Some occupational therapists believe that a "sensory diet" is helpful for children with ADHD. A sensory diet is a series of activities designed to provide a child with different types of sensory input (vestibular, proprioceptive, and tactile) at various times throughout the day in order

to help regulate the sensory systems (Pfeiffer, Henry, Miller, & Witherell, 2008). The idea of a sensory diet is grounded in sensory integration theory as proposed by Jean Ayres. Ayres stated that sensory integration is the way our brain and nervous system organizes and interprets the input from our senses. Good sensory integration, Ayres argued, is the "foundation for academic learning and social behavior" (2005, p. 5). She felt that problems with sensory integration (now most often referred to as sensory processing disorder, or SPD) could lead to hyperactivity and difficulty attending in school. According to Ayres, children who are hyperactive or distractible have a hard time shutting out unimportant sensations, such as background noise or the feeling of their shirt against their skin, due to "excess neural activity" and a decreased ability to "organize sensory input" (Ayres, 2005, p. 51).

Studies have shown that children diagnosed with SPD process sensory information differently than typical children on a physiological level. A study by Schaaf, Miller, Seawell, and O'Keefe (2003) measured the heart rate of children with and without sensory processing problems during the Sensory Challenge Protocol. The Sensory Challenge Protocol involves the application of tactile, olfactory, visual, auditory, and vestibular stimuli during a simulated space ship ride. The children with SPD had "significantly lower cardiac vagal tone" (Schaaf, et al., 2003, p. 446), a "marker of parasympathetic activity" (p. 445), in response to the sensory stimulation as compared to typical children. In other words, these children had "less effective parasympathetic functioning" (Schaaf, et al., 2003, p. 446). Another study measured the electrodermal response of children diagnosed with SPD compared to the response of typical children during the Sensory Challenge Protocol (McIntosh, Miller, Shyu, & Hagerman, 1999). A number of differences were found. Children with SPD were less likely to respond to the sensory

stimuli, but those who did respond responded more strongly and habituated more slowly than the typical children (McIntosh, et al., 1999).

Studies have also shown that children with ADHD are more likely than typical children to experience difficulties related to sensory processing. Yochman, Parush, and Ornoy (2004) examined sensory processing in young children with ADHD. Based on parent report using the Sensory Profile, the researchers found that children with ADHD were significantly more likely than their typical peers to have sensory processing deficits (Yochman, et al., 2004). Mangeot, et al. (2001) used electrodermal response to the Sensory Challenge Protocol, as well as parental rating scales, to measure sensory processing of children with ADHD and of typical children. According to all measures, the children with ADHD were significantly more likely to have problems with sensory processing. Only one out of thirty typically developing children showed indication of dysfunction on the Sensory Processing Measure, while 77% of the children with ADHD had scores that indicated sensory processing difficulty (Mangeot, et al., 2001). A study by Lane, Reynolds, & Thacker (2010) found indications of sensory over-responsivity in 46% of children with ADHD versus 20% of typical children. Huecker and Kinnealey (1998) found that, on the Sensory Integration and Praxis Test (SIPT), 88.8% of children with ADHD were hypersensitive in at least one area and 68.9% had at least one area of hyposensitivity.

Occupational therapists often use sensory integration strategies when working with children with ADHD. They may "modify the environment" to help children attend (American Occupational Therapy Association, 2004). According to Cermak (1988), parents and teachers observe behavioral improvements in children with ADHD following sensory integration therapy sessions. Sensory integration therapy has been found to be effective for children with sensory processing problems. One study found that children who received SI therapy displayed

significant gains in goal areas, as well as gains in attention and possible reduction in hyperactivity as compared to control groups (Miller, Coll, & Schoen, 2007). The results of a recent critical appraisal suggest that sensory techniques can be effective at improving behavior and attention in the classroom (Worthen, 2009). Some sensory techniques that have been found to be beneficial for children with ADHD include weighted vests (VandenBerg, 2001), physical activity (Azrin, Vinas, & Ehle, 2007; Ridgway, Northup, Pellegrin, LaRue, & Hightshoe, 2003), dynamic seating (Pfeiffer et al., 2008; Schilling, Washington, Billingsley, & Deitz, 2003), and tactile stimulation (Amato-Zech, Hoff, & Doepke, 2006; Kercood, Grskovic, Lee, & Emmert, 2007; Kercood & Grskovic, 2010; Monem, 2010; Stalvey & Brasell, 2006).

The deep pressure provided by weighted vests is believed to "produce a calming effect" by increasing parasympathetic activity (VandenBerg, 2001, p. 622). It may also stimulate the release of specific neurotransmitters, which may reduce hyperactivity (VandenBerg, 2001). VandenBerg assessed the effect of weighted vests on four kindergarteners with ADHD (2001). She found that the vests significantly increased on-task behavior in all four of the children. One of the children also wore the vest to an after-care program, where staff reported that the child was calmer and better able to interact with other children when wearing the vest (VandenBerg, 2001).

Gross motor activity has been shown to reduce hyperactivity and distractibility in children with ADHD. Azrin, et al. (2007) tested the effect of physical activity as a reinforcer for two 13 year-olds with ADHD and intellectual disabilities in a special education classroom. When the students behaved appropriately for 15 minutes, they were allowed to go to a play area for five minutes where they "engage[d] in vigorous activity with the play equipment" (p. 3). During baseline, the students were off-task at least 90% of the time. After the intervention, both

students were on-task 100% of the observation time, and staff reported that the students had improved.

Another study examined the effect of recess on behavior of second-graders with and without ADHD (Ridgeway et al., 2003). Classroom observation revealed that the children with ADHD displayed "increasing levels of inappropriate behavior" as the morning progressed prior to intervention (p. 258). The children were then given recess, consisting of free play outdoors with access to a playground and outdoor toys (jump ropes, balls, etc.), on alternating days. Classroom observation showed that, for the children with ADHD, behavior remained stable throughout the morning on days when they had recess but was comparable to the baseline (i.e. worsened) on days when they did not. The same results held true to a lesser degree for the typical children.

Seating which allows children to move around while in their chair, or dynamic seating, has been shown to improve behavior in children with ADHD. Pfeiffer et al. (2008) tested the effectiveness of the Disc 'O' Sit cushion at "improving attention to task" (p. 276) in second-graders with attention difficulties. The Disc 'O' Sit is an air-filled cushion that can be placed on the seat of a chair. It is meant to stimulate "the proprioceptive and vestibular systems to keep [the user] alert and focused . . . [and] to address poor attention" (Pfeiffer, et al., 2008, p. 275). The children in the treatment group sat on the cushion for two hours a day for two weeks. Teachers completed the BRIEF, a questionnaire designed to assess students' self control and problem solving skills, before and after the intervention. The BRIEF scores indicated that the children using the Disc 'O' Sit improved to a statistically significant degree as compared to children in the control group.

Therapy balls have also been used as seating for children with ADHD. One study examined the in-seat behavior of fourth-graders with and without ADHD when seated on a therapy ball as compared to when seated on a regular chair (Schilling et al., 2003). When seated in chairs, the students with ADHD were often out of their seat. All of the students with ADHD spent more time in their seats when using therapy balls. They "reported preferring balls to chairs" (p. 537), as did the majority of the typical students. The teacher reported that the students were more focused and quieter when seated on the balls. She also reported that the students remained calmer and more focused for 30 to 45 minutes after returning to typical seating (during the study, the balls were only used during the language arts period). The researchers felt that, while on the therapy balls, the students could "self-modulate for personal sensory needs . . . in order to maintain an optimum state of arousal" (p. 540). Following the conclusion of the study, the teacher continued to use the therapy balls as seating for the children with ADHD as well as for some of the other students.

Various forms of tactile stimulation have been found to increase on-task behavior for children with attention difficulties. Amato-Zech, et al. (2006) assessed the effectiveness of vibrating beepers for three fifth-graders in a special education setting. The students wore beepers, which vibrated every three minutes, during classroom instruction. Each time the beeper vibrated, the students recorded whether they were on or off task. On and off task behavior was also recorded by the researchers. All of the students demonstrated an increase in on-task behavior when wearing the beeper. The students enjoyed wearing the beepers and the teachers reported that they planned to use the beepers for students with attention difficulties in the future.

The stimulation provided by the beeper is passive. More often, active tactile stimulation is recommended for children with attention difficulties. Many sources make reference to using

fidget toys in a school setting for children with hyperactivity, either as part of a sensory diet or as a unique intervention. Both professional and practical sources recommend fidget toys. Haack and Haldy, in an occupational therapy textbook, state that having "squeezing and stretching objects available" (1998, p. 16) in the classroom can help calm children who are hyperactive. A guidebook for teachers notes that children with ADHD are often better able to self-regulate and stay alert when allowed to "hold and manipulate" a small object in their hands (Rief, 2005, p. 154). Gould and Sullivan, in a book for early childhood educators, suggest giving children with ADHD and other disabilities fidget toys during circle time (1999).

There is no one definition of a "fidget toy." Sources agree that it is a small object that a child can hold in the hand and squeeze, stretch, bend, or otherwise manipulate to help maintain focus and stay on task. Companies that sell fidget toys offer a wide variety of products, including stress balls, putty, pencil toppers, bendable or stretchable bands, and "Tangle" toys (Therapy Shoppe, n.d.; Trainer's Warehouse, n.d.). Some of these objects, such as stress balls, bands, and putty, may provide proprioceptive input and increase parasympathetic activity in a manner that is hypothesized to be similar to the input received from weighted vests (VandenBerg, 2001). Children can decide when to use the toy and how much force to apply, allowing them to self-modulate the sensory input to suit their individual needs.

Several studies suggest that allowing children with attending difficulties to use fidget toys or other manipulatives may result in improved behavior and academic performance. Monem (2010) compared the effectiveness of journaling versus tactile stimulation in a seventh-grader with behavioral difficulties. The goal of the intervention was to increase the student's appropriate verbal behaviors, such as waiting until called on to speak, during a language-arts class. For both conditions, the student recorded his perceptions about the appropriateness of his verbal behaviors

on a self-monitoring checklist. During the journaling condition, he provided a written response about his behavior. During the tactile stimulation condition, he was provided with a stress ball to manipulate during the lesson. The classroom teacher also recorded the appropriateness of all the student's verbal behaviors during each session. An increase from baseline in appropriate behavior occurred both for journaling and tactile stimulation. However, the increase was greater during the tactile stimulation condition.

Stalvey & Brasell (2006) provided stress balls to a regular education class of sixth-grade students. One student in the class had a diagnosis of ADHD. Prior to beginning the intervention, the students completed an assessment to determine their learning style. The students demonstrated a decrease in off-task behavior and improvements in writing quality when they had access to the stress balls. The improvements were greatest for kinesthetic learners and the student with ADHD. Stalvey & Brasell also reported that the presence of the stress ball appeared to be a cue to focus for some students, even when they were not manipulating it.

Several studies have been conducted using the Tangle Puzzle Jr. fidget toy. Kercood, et al. (2007) studied the effect of this product on behavior and academic performance of four fourth-graders with attention problems and hyperactivity. During baseline, the children were given twenty minutes to solve math word problems on nine to ten separate occasions. The number of questions attempted, number of answers correct, and amount of time off-task were measured. During the intervention phase, the children were given a fidget toy (the Tangle Puzzle-Jr.) to manipulate while answering the math questions. Attempted questions, correct answers, and behavior were again recorded over nine to ten sessions. Analysis of the data showed that two of the children answered more questions correctly during the intervention phase.

The same children also attempted more questions during the intervention. All of the students displayed an increase in on-task behavior during the intervention phase.

During the initial study using the Tangle Puzzle Jr., the children were in a quiet, empty classroom (Kercood, et al., 2007). Additional studies using this product (Kercood & Grskovic, 2010) were conducted by two of the authors of the first study. They were interested in the effects of the fidget toy on performance when visual or auditory distractions were present. Both of the follow-up studies used a single-subject design. All participants were 10-year-old children with ADHD. During the visual distraction study, the children sat in a classroom with posters on the walls, facing a window. Teachers walked in and out of the room during testing. The children listened to recordings of math word problems and answered aloud. Each child had ten baseline and five intervention sessions. During the intervention phase, the fidget toy was made available. Two of the three children consistently answered more problems correctly during the intervention phase, while results for the third child were mixed.

The auditory distraction study consisted of four phases: baseline, auditory distraction, auditory distraction with the fidget toy, and fidget toy without auditory distraction (Kercood & Grskovic, 2010). Each phase lasted five sessions. Auditory distractions consisted of recorded noises, including speech and a telephone ringing, played at random intervals throughout the session. Math word problems were presented visually and the children responded verbally. Two of the three children answered fewer problems correctly during the auditory distraction phase. Performance improved for these children when the fidget toy was introduced. As in the visual distraction study, results for a third child were too inconsistent to draw conclusions.

Taken together, studies suggest that tactile stimulation is helpful to some, but not all, children with attention and behavioral difficulties. Fidget toys may improve behavior and

academic performance for these children. Several of the existing studies on fidget toys have been conducted outside the classroom. More studies are needed to assess the effect of fidget toys during classroom instruction. In addition, existing studies have not assessed attention to task. It is possible that fidget toys may be distracting to children with attending difficulties, resulting in decreased attention. Studies are needed to determine whether children with attending difficulties can maintain attention while manipulating a fidget toy.

Chapter 3: Methods and Procedures

Research questions

Do fidget toys increase on-task behavior for children with hyperactivity or attending difficulties in the classroom? Do fidget toys increase attention-to-task for children with hyperactivity or attending difficulties in the classroom? Do fidget toys increase attention-to-task for children without hyperactivity or attending difficulties in the classroom? Will children with more indication of sensory processing differences on the Sensory Profile benefit more from the fidget toy?

Research Design

A single subject AB design was used. In single subject research, the child acts as his or her own control, and data is collected from each session, allowing the researcher to see the effect of intervention on each child in a continuous manner. The single subject design is used when there is a small sample size. It allows the data of each subject to be tracked independently. The intervention may have a different impact on each of the students. Therefore, a single subject design will yield stronger and more accurate results, and will allow the researcher to examine results in the context of each child (Portney & Watkins, 2009). While an ABA design would provide stronger results, such a design was impossible due to time constraints.

Participants

A general education third-grade classroom at an elementary school in central New York was used for this study. All students in the class were male. All consenting children in the classroom were included in a measure of attention.

The classroom teacher selected four students who she believed displayed hyperactive behavior or difficulty attending in the classroom. She completed the Teacher Short Form from

the 3rd Edition of the Conners scale, or Conners 3-T(S), for these students. Three of these students, Eric, Chris, and Brian, received scores in the "very elevated" range on the inattention or hyperactivity/impulsivity subscales and were selected for observation. According to parent report, Eric and Chris are not formally diagnosed with any disability and do not receive occupational therapy services. Brian is diagnosed with ADHD and Neurofibromatosis Type I and receives school-based OT services. Brian has a paraprofessional assigned to him throughout the school day.

Measures

The Conners 3-T(S) was used to confirm difficulties with attending and hyperactive behavior for four students selected by the classroom teacher. The Conners 3-T(S) is filled out by the classroom teacher. It can be used for children ages six through eighteen and takes approximately 10 minutes to complete. Frequency or intensity of the behavior in question is rated on a 4 point Likert scale. The assessment consists of 41 questions related to inattention, hyperactivity/impulsivity, learning problems/executive functioning, defiance/aggression, and peer relations. Standardized scores are calculated for each of the categories based on the child's age, gender, and raw scores (i.e. teacher's responses). A higher T-score or percentile indicates a greater degree of dysfunction. Standardized scores are interpreted as: low score, average score, high average score, elevated score, and very elevated score. The reliability scores for the Conners 3-T(S) are as follows: internal consistency 0.91, test-retest 0.78, inter-rater reliability 0.77 (Conners, 2009). The Conners 3-T(S) has been found to have discriminative validity (Conners, 2009).

The Sensory Profile School Companion (Dunn, 2006) was used to assess sensory processing for Eric, Chris, and Brian. The Sensory Profile School Companion is a questionnaire

filled out by the classroom teacher. It contains 62 items related to a child's sensory processing in the school environment. The Sensory Profile School Companion provides three sets of scores – quadrant scores, school factor scores, and section scores – which are used to determine the areas in which a child is experiencing sensory processing difficulties. Scores falling one to two standard deviations above or below the mean are considered areas of probable difference. Scores falling more than two standard deviations above or below the mean are considered areas of definite difference. The Sensory Profile School Companion can be used for children in preschool through sixth-grade and takes approximately 15 minutes to complete. It has an internal consistency of 0.83 to 0.95 and a test-retest reliability of 0.80 to 0.95 (Dunn, 2006).

On-task behavior and use of the fidget toy was measured using a Behavioral Observation Form (BOF) developed by the researcher (Appendix 3). Students were observed in sequence for five-second intervals over 10 minutes. A total of 40 observations of each student were recorded during each observation period. A student was considered off-task if he displayed any of the following behaviors during an observation interval: getting out of his seat without permission, speaking or otherwise vocalizing out of turn, manipulating or reading material unrelated to the task, or using materials inappropriately (e.g. chewing on a pen). If none of these behaviors were observed, the student was recorded as on-task. If a student was off-task, the specific behavior he engaged in was noted. Fidget toy use was recorded if the student was in contact with the fidget toy at any point during an observation interval. To establish inter-rater reliability, the researcher and another occupational therapy graduate student completed the Behavioral Observation Form on three college students during a lecture. Agreement was found to be approximately 93% with agreement on 112 out of 120 observations.

Attention-to-task was measured using the Classroom Attention Measure (CAM) developed by the researcher (Appendix 4). The CAM measures students' attending behaviors during listening-based lessons in the classroom. Students were provided with a list of the following ten letters printed horizontally across a piece of paper: M, A, R, F, L, P, Z, K, I, O. During the lesson, the teacher read one letter aloud approximately every four minutes. The teacher read only four of the ten letters on the students' list. Students were instructed to circle the letters the teacher said. The students were given the same letters each time the CAM was administered, but the order of the letters varied. The teacher was provided with a different set of letters to read each time the CAM was administered.

Procedure

Prior to beginning the study, the classroom teacher, the students, and the students' parents or guardians signed an informed consent form. Parents were also asked to complete a demographics form on their children. Data was only collected on students who returned signed consent forms.

Baseline. The researcher spent three twenty-minute periods in the classroom to allow the students to get accustomed to the presence of a new person in the room. The researcher introduced herself as a college student interested in learning about third-graders and how they learn. The teacher administered the CAM on each of the three days to control for the effects of novelty. The data from these days was not included in the analysis.

The baseline period consisted of five observation periods over the course of two weeks. Observations typically took place during the students' math lesson. Most lessons consisted of students responding to questions on individual dry erase boards, working with a Smart Board, and listening to direct instruction. Games and other activities were sometimes incorporated into

the lessons. Eric, Chris, and Brian were observed by the researcher using the BOF. All students in the class participated in the CAM during baseline.

Intervention. All students in the class were provided with a fidget toy, the Textured Tangle Jr. The researcher explained the purpose of the fidget toy and the study to the students. The students were told that some people believe items like the Tangle toy help children pay attention in class and other people disagree. They were told that the researcher wanted to learn whether or not the fidget toy was helpful. The researcher demonstrated how the fidget toy could be manipulated using one or both hands. The students were told that the toy was to remain in their hand or on their desk. They were warned that the teacher would take the fidget toy if they used it inappropriately. Following this explanation, the students were given the opportunity to ask the researcher questions. The students were given a two-day trial period with the fidget toys. During this time, the students used the toy during their math lesson but no data was collected. Following the trial period, data collection for the intervention period began.

Initially, the students only had access to the fidget toy during math lessons. On day three of the intervention phase, the teacher requested that the students have free access to the fidget toys throughout the day. She felt that this would be less disruptive and distracting. It was agreed that the students would keep the fidget toys in their desks and have access to them throughout the day. During the times when the researcher was observing, the students were asked to take their fidget toy out. Intervention phase data was taken on ten occasions over four weeks. The procedure for data collection was the same as baseline.

Chapter 4: Results

Eric's score on the Conners was very elevated for hyperactivity/impulsivity. His score on the Sensory Profile indicated a probable difference in sensory sensitivity. His score was below the mean, meaning that he has below-average detection of sensory input (Dunn, 2009). During baseline, Eric was off-task 50% of the observation intervals. During intervention, he was off-task 23.6% of the observation intervals. This represents a decrease in off-task behavior of 52.8%. Distribution of off-task behaviors was similar during baseline and intervention. Eric spent the greatest number of intervals off-task engaging with unrelated materials. Intervals spent out of seat and vocalizing were approximately equal (see Table 1.1 and 1.2 for distribution of behaviors). Eric's behavior was inconsistent during both baseline and intervention, but appeared more stable during the intervention period (Figure 1).

During baseline, Eric correctly circled 100% of the letters on the CAM. During observation, this decreased to 83.33%. However, Eric was only present for 3 days of CAM administration during the intervention period. His score represents only 2 letters missed. Eric used the fidget toy during 49.45% of the observation intervals.

Chris's score on the Conners was very elevated for hyperactivity/impulsivity and high average for inattention. His score on the Sensory Profile indicated probable differences in sensory seeking. He scored above the mean, meaning that he actively seeks increased sensory input (Dunn, 2009). During baseline, Chris was off-task 38% of the observation intervals. During intervention, he was off-task 35% of the observation intervals. This represents a decrease in off-task behavior of 7.9%. Distribution of off-task behavior was similar during baseline and intervention. Chris spent the greatest number of off-task intervals engaging with unrelated materials, followed by vocalizations. He spent a minimal amount of time out of seat (see Table

2.1 and 2.2 for distribution of behaviors). Chris's behavior was inconsistent during both baseline and intervention (Figure 2).

During baseline, Chris circled 100% of the letters correctly on the CAM. During intervention, this decreased to 93.75%. This number represents only one letter missed. Chris used the fidget toy during 23.95% of the observation intervals.

Brian's score on the Conners was very elevated for inattention and elevated for hyperactivity/impulsivity. His score was also very elevated for peer relations and high average for learning problems. Brian's score on the Sensory Profile indicated differences in multiple areas of sensory processing. He had definite differences (above the mean) for both registration and avoiding. This means that he noticed sensory input less than other children, but was also disturbed by some sensory input (Dunn, 2006). His scores of probable difference above the mean for school factor one and definite difference above the mean for school factor three and school factor four indicate that Brian needed support to fulfill his sensory needs, was easily overwhelmed in the classroom, and withdrew from, or appeared disinterested in, classroom activities (Dunn, 2006). Review of the teacher's responses suggested that Brian was over-responsive to some forms of sensory input and under-responsive or sensory seeking in other areas. This is consistent with observations made by the researcher.

During baseline, Brian was off-task 32.5% of the observation intervals. During intervention, he was off-task 23.55% of the observation intervals. This represents a decrease in off-task behavior off 27.5%. Distribution of Brian's off-task behaviors differed between baseline and intervention. During baseline, Brian spent the majority of his off-task intervals engaged with unrelated materials, followed by time spent out of seat. His inappropriate vocalizations were minimal during baseline. During intervention, Brian spent the majority of his off-task intervals

out of seat, followed closely by engagement with unrelated materials. Although the fewest number of off-task intervals were inappropriate vocalizations, his average number of vocalizations during intervention increased from baseline (see Table 3.1 and 3.2 for distribution of behaviors). Brian's behavior was inconsistent during both baseline and intervention (Figure 2)

During baseline, Brian circled 43.75% of the letters correctly on the CAM. During intervention, this increased to 68.75%. This represents an increase in correct responses of 36.4%. Brian used the fidget toy during 58.55% of the observation intervals.

No trends appeared in the CAM scores for the other students in the class. The scores for students 1, 2, and 3 decreased by 2%, 5%, and 6.25% respectively and the scores for students 4 and 5 increased by 5% and 6.25% respectively.

Table 1.1

Off-task Behavior During Baseline: Eric

	Mean	Median	Range
Total off-task	**20 (50%)**	**24**	**10-27**
Unrelated Mat.	9.8	6	1-25
Vocalizations	5.2	4	0-11
Out of seat	5.4	5	1-13

Table 1.2

Off-task Behavior During Intervention: Eric

	Mean	Median	Range
Total off-task	**9.44 (23.6%)**	**10**	**1-19**
Unrelated Mat.	3.89	3	0-8
Vocalizations	2.56	2	0-11
Out of seat	3	2	0-8

Table 2.1

Off-task Behavior During Baseline: Chris

	Mean	Median	Range
Total off-task	**15.2 (38%)**	**14**	**8-23**
Unrelated Mat.	10.6	9	2-19
Vocalizations	4.2	4	1-9
Out of seat	0.4	0	0-1

Table 2.2

Off-task Behavior During Intervention: Chris

	Mean	Median	Range
Total off-task	**14 (35%)**	**14**	**1-28**
Unrelated Mat.	11.4	10	1-28
Vocalizations	2.08	2	0-7
Out of seat	0.42	0	0-2

Table 3.1

Off-task Behavior During Baseline: Brian

	Mean	Median	Range
Total off-task	**13 (32.5%)**	**13**	**8-18**
Unrelated Mat.	7	8	3-10
Vocalizations	0.2	0	0-1
Out of seat	5.8	6	0-14

Table 3.2

Off-task Behavior During Intervention: Brian

	Mean	Median	Range
Total off-task	**9.42 (23.55%)**	**9**	**0-21**
Unrelated Mat.	3.25	2	0-10
Vocalizations	1.83	1	0-5
Out of seat	4.33	3	0-13

Figure 1

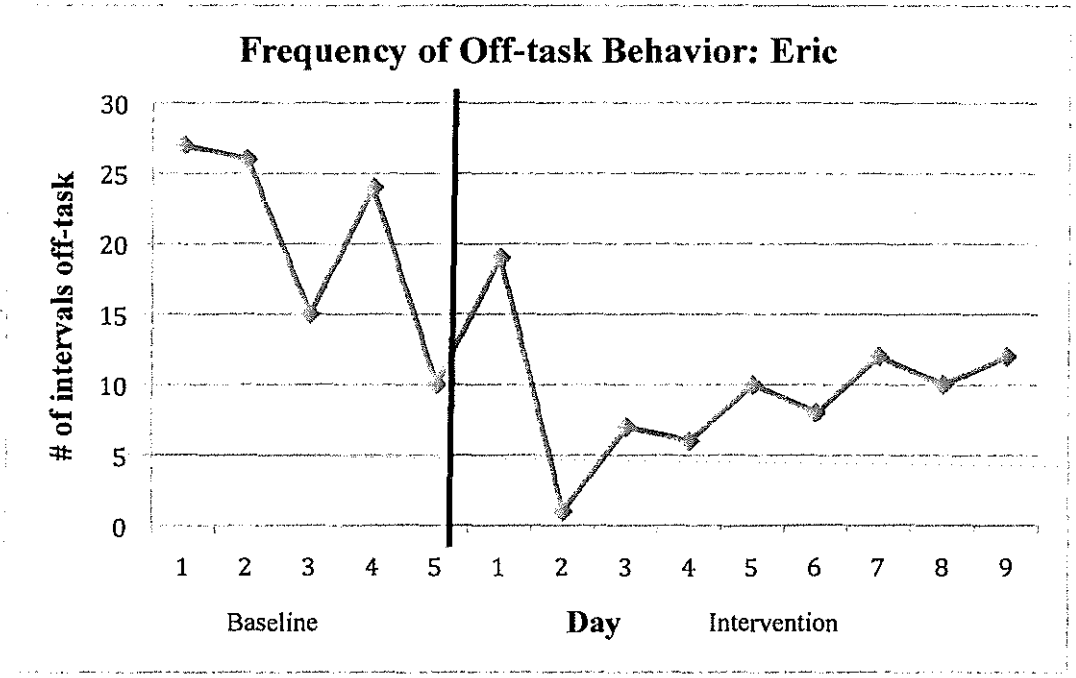


Figure 2

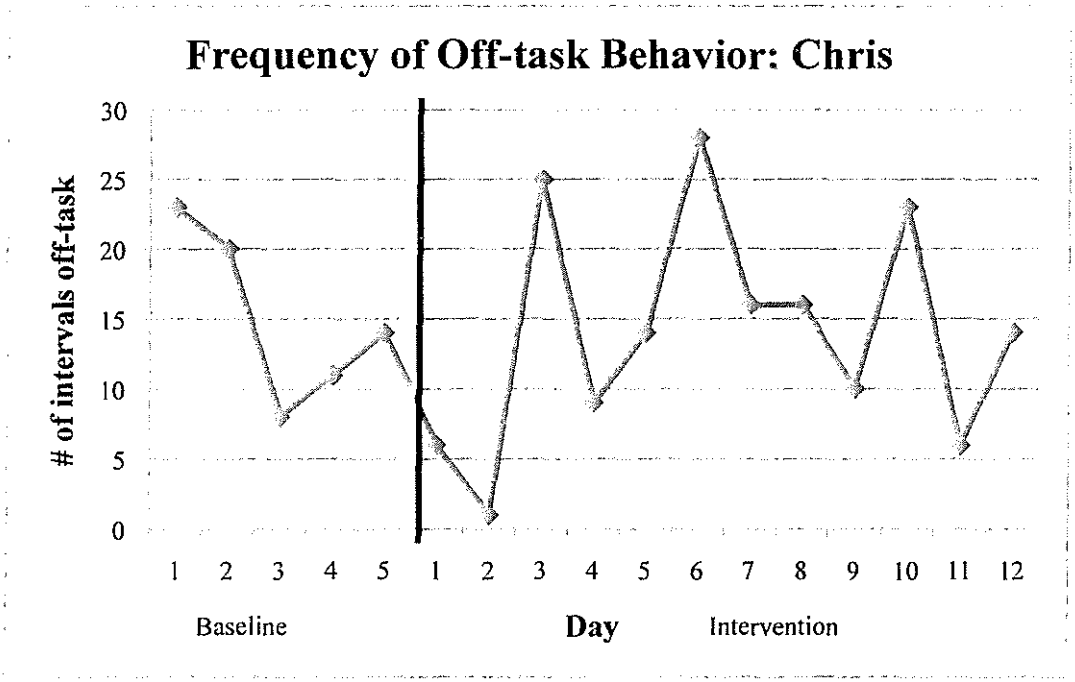
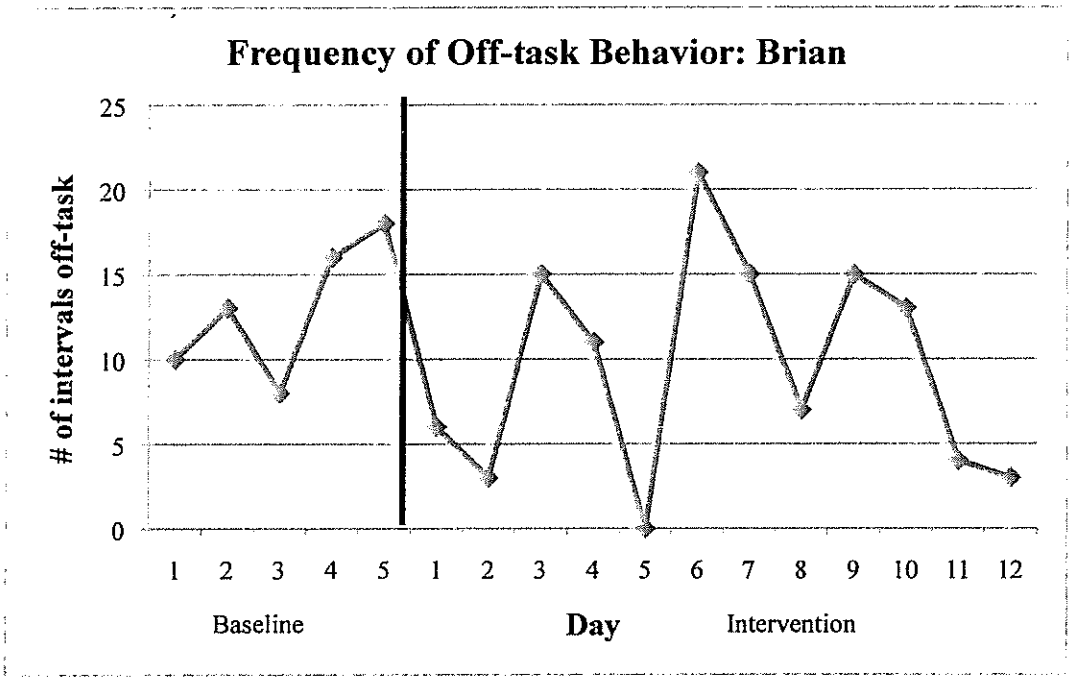


Figure 3


Frequency of Off-task Behavior: Brian
# of intervals off-task
25
20
15
10
5
0
1 2 3 4 5 1 2 3 4 5 6 7 8 9 10 11 12
Baseline
Day
Intervention

Chapter 5: Discussion

All three students displayed a high degree of variability in behavior during both baseline and intervention (See Figures 1-3). Unlike prior studies using the Tangle toy (Kercood, et. al., 2007; Kercood & Grskovic, 2010), which were conducted in "analog" classrooms where distractions were minimized or highly controlled, this study took place during classroom instruction. Eric, Chris, and Brian's behavior was influenced by many factors, including other students in the room, lesson content, and the visual and auditory distractions of a typical elementary school classroom. Due to the inconsistency in behavior, statistical testing of results could not be performed. A combination of visual analysis, mean difference in off-task behavior, and qualitative observations was used to analyze the data.

Eric demonstrated the greatest decrease in mean off-task behavior. During baseline, the researcher observed Eric engaging in what appeared to be sensory seeking behaviors. He was observed stomping his feet, banging his arms on his desk, and inverting himself over his chair. These behaviors, which may be due to insufficient sensory stimulation, can be interpreted as hyperactivity. During intervention, Eric rarely engaged in these behaviors. It is possible that the fidget toy provided sufficient stimulation, thus allowing Eric to sit more appropriately and spend less time off-task. On multiple occasions, Eric kept the fidget toy around his wrist as he worked. The fidget toy may have served as a reminder for him to stay on task. This is consistent with the findings of Stalvey & Brasell (2006). In their study, subjects reported that, even when they were not manipulating a fidget toy, its presence improved their focus.

The classroom teacher reported that Eric is highly intelligent and understands concepts more quickly than other students in the class. She believes that boredom may contribute to his

apparent hyperactivity. This suggests a possible alternative explanation for Eric's results. Eric may have used the fidget toy to keep himself occupied while waiting for the lesson to progress.

The fidget toys had no discernable effect on Chris's attention or behavior. Based on his Sensory Profile results, which suggested that he is sensory-seeking, it was expected that Chris would benefit from the fidget toy. However, he used the fidget toy only 23.95% of the time. When he did use the fidget toy, it was frequently as a play object rather than a self-regulation tool. During baseline and intervention, Chris was frequently observed drawing or coloring. This was considered using materials inappropriately and was coded as off-task, unrelated materials on the BOF. However, Chris's CAM results suggest that he was able to attend while drawing. Chris may use drawing as a self-regulation strategy, and the fidget toy did not have any added benefit.

Brian demonstrated both a decrease in off-task behavior and an increase in correct CAM responses during intervention. During baseline, he frequently had a "dazed" appearance consistent with decreased sensory registration. He rarely approached his peers or volunteered to answer questions during the lesson. During intervention, Brian appeared more alert and engaged. He initiated peer interactions on several occasions. He raised his hand or contributed to classroom discussion at least once on approximately half of the intervention days. Brian displayed more inappropriate vocalizations during intervention than during baseline. Although this outcome is not necessarily positive, it supports observations that the fidget toy increased Brian's overall affect. These effects are consistent with the findings of Kercood, et al. (2007), who reported that sitting on therapy balls provided students with sensory input and led to increased alertness for some students. It is possible that the fidget toy was alerting and helped Brian to attend and remain on task.

The fidget toys had no clear effect on attention for students without ADHD characteristics. The small changes in these students' scores on the CAM are likely insignificant. These students may not need additional stimulation in order to attend. Although the other students in the class were not observed directly, some general themes in fidget toy use were noted. At times, the fidget toys appeared to be a distraction for some of the students. Some students created shapes or objects ("coffee cups" and "guns") with their fidget toys, rapped the fidget toys on their desks, and swung them in the air.

The classroom teacher reported that she did not observe any improvements in the students' behavior during intervention and felt that the fidget toys were distracting for some of the students. She noted that she typically associates students looking at her or the board with attention. She felt that when the students were manipulating the fidget toys, their visual attention decreased. Despite this, she recognizes that her perception of the students' behavior may be incomplete. She plans to continue to use the Tangle toys and is interested in testing other types of fidget toys. She stated that a simpler fidget toy, such as a pipe cleaner, might work better for her students.

Limitations

Several limitations should be considered regarding the results of this study. Ideally, there would have been a return to baseline. This was not possible due to time constraints. The sample size in this study was limited and only one student was formally diagnosed with ADHD. Therefore, generalized conclusions cannot be drawn. The CAM was designed to be administered each day of intervention. However, the teacher frequently became involved in the lesson and was unable to say all of the letters. As a result, only five days of usable intervention-period CAM

data was available for interpretation. Therefore, results related to attention-to-task should be interpreted with caution.

Chapter 6: Summary, Conclusions, and Recommendations

This study examined the effects of fidget toys on on-task behavior and attention-to-task for three third-grade students with hyperactivity and inattention. It also explored the effects of fidget toys on attention for other students in the classroom. Results suggest that the fidget toys were beneficial to two of the three students observed. This adds to the evidence (Kercood, et al. 2007; Stalvey & Brasell, 2006) suggesting that fidget toys are an effective strategy for decreasing off-task behavior for some students with ADHD characteristics. It also supports the idea that fidget toys can improve attention-to-task for some students with ADHD characteristics. This study does not support the use of fidget toys to increase attention-to-task for students without attending difficulties or hyperactivity.

Further research is needed to determine the characteristics of students who will benefit most from fidget toys. Research into the relationship between Sensory Profile scores and the effectiveness of sensory-based interventions is needed. A larger sample size would allow researchers to draw conclusions about this relationship. Future research should also compare the efficacy of different types of fidget toys or other manipulative objects.

Appendix 1: Human Subjects Proposal

ALL-COLLEGE REVIEW BOARD FOR HUMAN SUBJECTS RESEARCH

COVER PAGE

Investigator: Amanda Rohrberger

Department: Occupational Therapy

Telephone: [redacted]

Project Title: The Efficacy of Fidget Toys in a School Setting for Children with Attention Difficulties

Abstract:

Research has found that many children with attention deficit hyperactivity disorder (ADHD) have differences in the way they process sensory information. According to sensory integration theory and optimal stimulation theory, children with ADHD may need more sensory input than typical children to stay on task. In schools, occupational therapists often recommend sensory-based techniques be used for children with ADHD. Existing studies have examined the effect of some of these interventions, including dynamic seating, weighted vests, and exercise, on on-task behavior in children with ADHD. Another frequently recommended sensory technique is providing children with ADHD with "fidget toys" (small, unobtrusive objects that can be manipulated in the hand) to use in the classroom. Minimal evidence on the effect of fidget toys exists. No studies looking at the effect of fidget toys during classroom instruction can be found in the literature.

This study will examine the effect of fidget toys on on-task behavior and attention to task for elementary-school-aged children with attention difficulties. Attention-to-task will be assessed by asking all students in the class to record numbers the teacher will read at points throughout the lesson. An increase in correct responses will indicate an increase in attention. Based on teacher report and the results of the Conner's Teacher Rating Scale and the Sensory Processing Measure, three students with attention difficulties will be selected for more careful observation. These students will be observed in their classroom during a listing-based lesson. Approximately 30 observations of each of the three students will be recorded during each 10-minute observation period. A device with a recording of the students' names spoken at correct intervals will assist the investigator in keeping track of the observations. Both of these measures will be tested on a college class prior to implementation.

This study uses a single subject design. The baseline phase of this study will consist of approximately five 10-minute observations. The intervention phase, during which all students will have a fidget toy, will consist of ten 10-minute observations. For consistency, all observations will be taken at the same time of day and during the same type of lesson. A two standard deviation band will be used to determine whether a significant difference exists between baseline and intervention for either of the two measures.

Proposed Date of Implementation: October 4, 2010

Amanda Rohrberger Carole Dennis

Name of Principal Investigator and Faculty Advisor

_____ _____

1. General Information

A. Funding

The Connors Rating Scale kit ($233.60), 28 Tangle Jr. Textured fidget toys ($87.36), and a gift certificate for the classroom teacher as incentive for participation ($50) will be needed for this study (Total cost $371). The Occupational Therapy department will provide the funds to purchase these materials.

B. Location

This study will take place at an elementary school. A typical second, third, or fourth-grade class will be used. The superintendent of a local public school district has indicated interest in this study (Appendix C). The director of special services of this school district has indicated that she does not believe the researcher will have difficulty finding a teacher willing to participate in the study.

C. Time Period

In early October 2010, the classroom teacher will be asked to complete the Conners Teacher Rating Scale and the Sensory Processing Measure on five students s/he believes to have difficulties with attention. Based on the results of these assessments, three students will be chosen for observation by the investigator. Five observation periods will be necessary for baseline and ten for the intervention phase. Observations will take place two to four times a week, depending upon the ability to coordinate classroom schedule and the researcher's class schedule. Observation will occur during the fall semester. Analysis of data will occur during the spring 2011 semester.

D. Expected Outcomes

It is expected that the students with attention difficulties will demonstrate a small but significant increase in on-task behavior during the intervention phase of this study. It is expected that all students in the class will show a small but significant increase in attention to task during the intervention phase. The increase in attention to task is expected to be greater in students with attention difficulties than in the general class population. As only one study exists on the use of fidget toys, these conclusions are based on the results of studies using other sensory-based techniques as well as research on attention deficit hyperactivity disorder and sensory integration theory. Due to the lack of existing research on fidget toys, outcomes may be different than expected. I anticipate that I will present the results of this study at a professional conference.

2. Related Experience of Researcher

a. Amanda Rohrberger

I received a BS in occupational science in May 2010. I have taken seven credits of coursework related to children with special needs. I have also taken courses on research design and statistics. This past summer (2010) I completed my level II occupational therapy pediatric fieldwork. I have extensive experience working with children, including children with special needs. I have volunteered in classrooms in the past and have an understanding of the classroom environment as well as experience working with teachers and classroom staff.

b. Dr. Carole Dennis

Dr. Carole Dennis is associate professor and chair of the Occupational Therapy Program. Dr. Dennis has advanced training in specific treatment approaches used for children with developmental disabilities, including Neurodevelopmental Treatment and Sensory Integration, and has written several book chapters on motor development in young children with special needs. Dr. Dennis has collaborated with students and colleagues in research studies related to a variety of issues for children with disabilities, including a study involving the effect of massage

on improving attending behavior in a child with autism. She teaches undergraduate courses in research methodology, and has mentored many graduate students in the research process.

3. Benefits of the Study

Occupational therapy is a field rooted in evidence-based practice. Currently, evidence supporting the use of fidget toys is lacking. This study would provide occupational therapists with data to consider when deciding whether to recommend the use of fidget toys. Some teachers are resistant to the use of fidget toys in their classrooms. If fidget toys are found to be beneficial, this study could be used by occupational therapists to defend the decision to recommend their use. If this study does not find a benefit to using fidget toys, occupational therapists may want to consider alternatives when recommending techniques to improve attention in the classroom. As this is a small study with a single subject design, the results will not be generalizable to all populations or situations. However, whatever its results, this study will add to the body of occupational therapy research.

It is anticipated that the fidget toys will increase attention to task and on-task behavior for the children in this study. If effective, a fidget toy may be a tool these children can use throughout their schooling.

4. Description of the Participants

a. Number of participants

One second, third, or fourth-grade class will be used for this study. From these consenting children, three children with attention difficulties will be selected for specific observation in this single-subject study.

b. Salient characteristics of participants

A demographic form (Appendix D1) and consent form will be sent to the parents/guardians of all students in the class. Of the students who return signed forms, the classroom teacher will select up to five students s/he believes have attention difficulties. The teacher will complete the Conners Teacher Rating Scale (Appendix D2) and the Sensory Processing Measure (Appendix D3) on these students. Based on the results of these assessments, the researcher will select up to three students for observation. The students with the highest scores on measures of inattention and hyperactivity on the Conners scale will be selected. If scores for all five students are similar, students with more indication of dysfunction on the Sensory Processing Measure will be selected.

5. Description of Participation

Participation of the classroom teacher:

The classroom teacher will select up to five consenting students s/he believes have attention difficulties. The teacher will complete the Conners Teacher Rating Scale (Appendix D2) and the Sensory Processing Measure (Appendix D3) on these students. During the study, the teacher will conduct a listening-based activity that is already part of the classroom routine (such as a read-aloud activity). Immediately before the listening-based activity begins, the teacher will give each child a fidget toy (which will be donated to the classroom teacher by the researcher). The teacher will be provided with a list of five numbers. At approximately three minute intervals throughout the activity the teacher will say one of the numbers aloud.

Participation of students:

All students in the class will have a list of ten numbers. This list will include all of the numbers on the teacher's list, interspersed with five other numbers. During the listening activity, the students will be asked to circle all numbers the teacher says aloud (Appendix D4). This is designed to measure attention to task.

The three students identified as having attention difficulties will be observed by the researcher during the listening-based activity (Appendix D5). These students will be observed in sequence for a period of ten minutes, with each student observed during an eight-second window, followed by a two second interval to allow recording of data. A total of approximately 30 observations will be recorded for each of the three students during each ten-minute observation period. This is designed to measure on-task behavior.

During baseline, the fidget toys will not be used. During the intervention phase of this study, all students in the class will be provided with a fidget toy (Tangle Jr. Textured) by the classroom teacher. The researcher will conduct a brief demonstration of how to use the toy prior to the first intervention session. The researcher will show the students how to manipulate the toy in one hand and will ask the students to use the fidget toy during the listening task. Following introduction of the fidget toy, two days without data collection will be provided for the students to become accustomed to using the toy. The fidget toys will be used only during the listening-based activity during the course of this study.

6. Ethical Issues

a. Risks of participation

This study involves minimal risk. When any new person is in the classroom, there is the risk of disruptions to learning. It is also possible that the fidget toys will be distracting to some students in the class. Steps will be taken to minimize these effects. The researcher will be introduced by the teacher and will sit in the classroom with all equipment that will be used during the study on one or two occasions prior to any data being taken. This will allow the students to become accustomed to the presence of an extra person in the room. The fidget toy being used is small and silent. Rules about appropriate use of the fidget toy (e.g. no throwing) will be laid out when it is initially introduced.

b. Informed consent

An informed consent form (Appendix B2) explaining the study will be sent home to the parents/guardians of all students in the class. Data will be collected on only those students who return the signed form to the researcher. The classroom teacher will also be asked to sign an informed consent form (Appendix B1).

7. Recruitment Procedure

a. Recruitment procedure

Following approval by the Human Subjects Committee, the superintendent or director of special services will contact the principal of the elementary school. A recruitment statement (Appendix A1) and letter of consent (Appendix B1) will be sent to second, third, and fourth-grade teachers. Teachers who agree to participate will be interviewed by the researcher to determine their classroom schedule. The classroom with a schedule that best aligns with times when the researcher is available will be selected to participate in the study. Once a teacher is selected for the study, a recruitment statement (Appendix A2) and letter of consent (Appendix B2) will be sent to parents/guardians of all students in the class.

b. Inducement to participate

The classroom teacher who participates in this study will be provided with a $50 gift certificate at the conclusion of the study.

8. Confidentiality/Anonymity

No recording devices (visual or audio) will be used in this study. No one other than the researcher will have access to identifying information about the participants. Initials or pseudonyms will be used in all written materials.

Recruitment Statement for Teachers

Dear (teacher),

My name is Amanda Rohrberger. I am a graduate student in the occupational therapy program at Ithaca College. As part of the requirements for graduation I am conducting a study. I am interested in learning whether "fidget toys" improve attention and on-task behavior for students with attention difficulties.

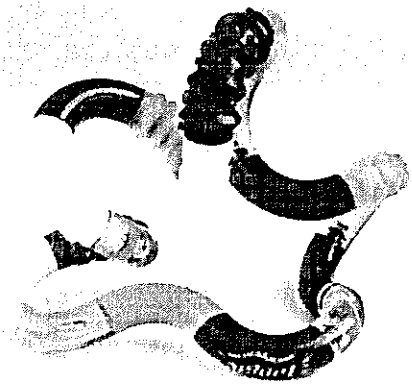
During the intervention phase of my study, a classroom teacher will provide all students in the class with "fidget toys." Fidget toys are small, unobtrusive objects, such as stress balls, that can be manipulated in the hand. Some people believe that fidget toys help students with attention difficulties stay alert and attentive. I will be assessing whether the students with attention difficulties display an increase in on-task behavior when manipulating a fidget toy.

I am looking for a 2nd, 3rd, or 4th grade classroom in which to conduct my study. I will be observing for approximately sixteen 10-minute sessions over 10-12 weeks. The teacher who participates in this study will receive a $50 gift certificate as a token of my appreciation. If you are interested in participating please read the attached informed consent form for a description of the study. If you would like more information, please contact me at: or arohrbe1@ithaca.edu.

Thank you,

Amanda Rohrberger

Picture of the fidget toy being used



Recruitment Statement for Parents/Guardians

Dear parent/guardian and student,

My name is Amanda Rohrberger. I am a graduate student in the occupational therapy program at Ithaca College. As part of the requirements for graduation I am conducting a study. I am interested in assessing whether "fidget toys" improve attention and on-task behavior for children with attention difficulties.

Fidget toys are small, unobtrusive objects, such as stress balls, that can be manipulated in the hand. They are a tool being used by your child's teacher to improve students' attention and on-task behavior during class. I will be assessing whether students display an increase in on-task behavior and attention to task when manipulating a fidget toy. You will be asked to allow the researcher to observe your child's behavior during class. You will also be asked to allow the teacher to complete questionnaires related to your child's behavior and responses to sensory experiences. Completed questionnaires will be shared with the researcher.

Your child's teacher is allowing me to conduct the study in his/her classroom. Observation dates and times will be pre-approved by the teacher. I will be observing on approximately 16 occasions for 10-minute sessions over 10 to 12 weeks. Please read the attached informed consent form for a description of the study. If you are interested in participating in the study, please sign the informed consent form and complete the attached Demographic Form and return them to me in the enclosed envelope (no stamp required). If you would like more information, please contact me at [redacted] or arohrbe1@ithaca.edu.

Thank you,

Amanda Rohrberger

Informed Consent Form for Teacher

INFORMED CONSENT FORM FOR CLASSROOM TEACHER

The Efficacy of Fidget Toys in a School Setting for Children with Attention Difficulties

1. Purpose of the study

Occupational therapists sometimes recommend that children with difficulty paying attention be allowed to use a fidget toy during class. Fidget toys are small objects, such as stress balls, that can be manipulated in the hand. It is believed that the extra stimulation the fidget toy provides helps children to stay alert. My study will examine whether fidget toys increase children's attention and focus during a classroom activity. All children in the classroom will be given a fidget toy to use during this activity.

2. Benefits of the study

Occupational therapy is a profession based on science. Right now, there is very little research on whether fidget toys help children focus. This study will help to determine whether or not fidget toys help children to focus in the classroom. If study findings indicate that fidget toys are helpful, occupational therapists will be able to recommend them with increased confidence. If the study does not find a benefit to fidget toys, occupational therapists may want to consider other ways of helping children pay attention. By allowing me to conduct this study in your classroom, you will be contributing useful information to the occupational therapy profession and the broader research community.

3. What you will be asked to do

Prior to beginning the study, consent forms will be sent home to the parents/guardians of all students in your class. Of the students who return signed consent forms, you will be asked to select up to five students who you feel have difficulties attending in the classroom. For these students, you will complete a questionnaire related to attending behaviors (the Conners Teacher Rating Scale) and a questionnaire related to the child's responses to sensory experiences (the Sensory Processing Measure). Based on the results of these assessments, I will select three of these students for observing attending and on-task behaviors.

I will observe your class during a listening-based activity that is already part of your normal classroom routine for ten minutes on each observation day over approximately 16 sessions during a period of ten to twelve weeks. During the listening-based activity, I will ask you to read numbers at random times throughout the listening activity from a list provided to you. The students will record the numbers that you read. During the baseline phase of my study, students will not be given fidget toys. During the intervention phase of the study, you will be asked to give fidget toys to all students in your class during the listening-based activity. The fidget toys will be donated to your classroom by Ithaca College. You will be asked to collect these toys at the end of each observation session.

4. Description of possible risks

This study involves minimal risk. It is possible that the fidget toy will be distracting to some students. Precautions will be taken to avoid this. Students will be shown how to appropriately use the fidget toy. Students will only have access to the fidget toy for a short portion of the school day. If you find that the fidget toys are distracting for some of the students, it may be possible to make modifications to the study. Please speak to me if you have concerns at any point during the study. Teacher's Initials _____

5. If you would like more information about the study before, during, or after the study, please call me at or e-mail me at arohrbe1@ithaca.edu.
6. Withdrawal from the study

You are free to withdraw from this study at any time. Please contact me if you wish to withdraw.

7. How data will be maintained in confidence

No video or audio recording devices will be used in this study. All names and other identifying information will be changed in any publically available material. Research records will be kept in a locked cabinet in the occupational therapy department.

I have read the above and I understand its contents. I agree to participate in the study.

_____

Print Name

_____ _____

Signature Date

Informed Consent Form for Parents/Guardians and Children

INFORMED CONSENT FORM

The Efficacy of Fidget Toys in a School Setting for Children with Attention Difficulties

1. Purpose of the study

Occupational therapists sometimes recommend that children with difficulty paying attention be allowed to use a fidget toy during class. Fidget toys are small objects, such as stress balls, that can be manipulated in the hand. It is believed that the extra stimulation the fidget toy provides helps children to stay alert. My study will examine whether fidget toys increase children's attention.

2. Benefits of the study

Occupational therapy is a profession based on science. Right now, there is very little research on whether fidget toys help children focus. Occupational therapists recommend fidget toys because, based on our knowledge of behavior, the sensory systems, and other research, we believe they should increase attention. This study will help to determine if fidget toys help children to focus in the classroom. If this study finds that fidget toys are helpful, occupational therapists will be able to recommend them with increased confidence. If the study does not find a benefit to fidget toys, occupational therapists may want to consider other ways of helping children pay attention. By allowing me to conduct this study in your classroom, you will be contributing useful information to the occupational therapy profession and the broader research community.

3. What you will be asked to do

If you agree to participate in this study, you will be asked to allow the researcher to observe your behavior during class. You also agree to allow the teacher to complete questionnaires related to behavior and responses to sensory experiences. You agree to allow the teacher to share these questionnaires with the researcher.

If you consent to participate in this study, your parents will be asked to complete a form that provides some information about you.

4. Description of possible risks

This study involves minimal risk. It is possible that the fidget toy will be distracting for some students. It is also possible that my presence in the classroom will be distracting to some students. Precautions will be taken to reduce these risks.

5. If you would like more information about the study before or during or after the study, please call me at or e-mail me at arohrbe1@ithaca.edu.

6. Withdrawal from the study

You are free to withdraw from this study at any time. Please contact me if you wish to withdraw.

7. How data will be maintained in confidence

No video or audio recording devices will be used in this study. All names and other identifying information will be changed in any publically available material. Research records will be kept in a locked cabinet in the occupational therapy department.

Child's Initials _____ Parent/Guardian Initials _____

Child

I have read the information above or an adult has read it to me. I understand its contents and agree to participate.

_____

Print Name

_____ _____

Signature Date

I agree to let my teacher share questionnaires about behavior and responses to sensory experiences with the researcher.

_____

Print Name

_____ _____

Signature Date

Parent/Guardian

I have read the above and I understand its contents. I agree to allow my child to participate in this study.

_____

Print Name

_____ _____

Signature Date

I agree to let my child's teacher share questionnaires about behavior and responses to sensory experiences with the researcher.

_____

Print Name

_____ _____

Signature Date

September 1, 2010

To Whom It May Concern:

I have read an outline of the research project that Amanda Rohrberger hopes to carry out to meet the requirements for her master's degree in Occupational Therapy Department at Ithaca College. While I cannot provide approval for the project until we have the opportunity to review the full proposal for the study, I believe that a project like the one she proposes might be of interest to teachers and supported by the Lansing Central School District.

Sincerely,

Stephen L. Grimm, Ed.D.
Superintendent of Schools
Lansing Central Schools
284 Ridge Road
Lansing, New York USA 14882
Phone: (607) 533 - 3020 Ext. 4001
Fax: (607) 533 - 3602
E-Mail: Stephen.Grimm@lcsd.k12.ny.us
Website: www.lcsd.k12.ny.us

Appendix 2: Demographics Form

Dear Parents and Guardians,

Please complete the following information form about your child.

Child's Name _____ Date of Birth _____

Gender: Male Female

1a. Does your child currently receive any special education services?
Yes No

1b. If yes, please list below

_____

2a. Does your child currently, or has s/he ever, received occupational therapy services?
Yes No

2b. If yes, please briefly describe when, where, and why services were delivered.

_____

_____

3. Has your child ever been diagnosed with attention deficit hyperactivity disorder (ADHD)?
Yes No

4a. Does your child have any other diagnosed disability?
Yes No

4b. If yes, please list below

_____

_____

_____
Print Name

_____ _____
Signature Date

Appendix 3: Behavioral Observation Form

	Eric	Brian	Chris
Observation 1	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 2	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 3	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 4	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 5	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 6	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 7	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 8	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 9	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 10	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 11	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 12	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
	O/S=Out of seat	V=Vocalization	U/M=Unrelated material

Obs. 13	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 14	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 15	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 16	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 17	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 18	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 19	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 20	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 21	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 22	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 23	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 24	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 25	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:

Obs. 26	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 27	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 28	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 29	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 30	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 31	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 32	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 33	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 34	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 35	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 36	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 37	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 38	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:

Obs. 39	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:
Obs. 40	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:	**On Task Y N** **Using Fidget Y N** O/S V U/M Other:

Appendix 4: Classroom Attention Measure

Letters for student:

P R K M L F A I O Z

Letters for teacher to read aloud (example):

M O R I

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