Examining the Effectiveness of Fidgets on Attention of Elementary Students with ADHD

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Abstract
Research demonstrates students with attention-deficit hyperactivity disorder (ADHD) and other attention difficulties benefit from using tools to expend energy in positive, socially acceptable means while not distracting others. Tactile fidgets may assist with self-regulated behaviors. This study examined the effectiveness of using hand and foot fidgets to increase the focused instructional attention of four elementary students with ADHD. All four participants selected their preferred fidget and used appropriately as directed. ABAB withdrawal design results indicated immediate level and trend change with a 45-55% overall attention gain. Results and implications for future research are discussed.

Key Words: attention, focus, fidgets, ADHD, elementary students
1. Introduction

Inattentive, impulsive and overactive behaviors describe attention-deficit hyperactivity disorder (ADHD) (American Psychiatric Association, 2013). Children with ADHD frequently display difficulty in sustaining attention, self-regulation, and hyperactivity (Fedewa & Erwin, 2011). Students with ADHD often struggle in school settings where the environment requires attending to instruction, following directions, staying organized, and completing tasks (Prater, 2007). ADHD may affect intellectual functioning and memory which can display itself in underachievement in academic performance, increased grade retention, and persistent behavioral problems (Loe & Feldman, 2007).

ADHD has the diagnostic criteria of exhibiting “a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development” (Attention-Deficit/Hyperactivity Disorder, 2017, Centers for Disease Control and Prevention). The prevalence of children and adolescents between the ages of 4 and 17 receiving a diagnosis of ADHD by a healthcare provider in the United States has been reported by Visser et al. (2014) as approximately 11%. Similarly, Pastor (2015) reported increasing trends in the diagnosis of ADHD by healthcare providers as reported by parents from 7% (1997-1999) to 10.2% (2012-2014) for those between the ages of 5 and 17. Impulsive and uncontrolled behaviors often distract others from instruction as the hyperactivity is difficult to ignore (Stalvey & Brasell, 2006). Lack of academic success and poor educational outcomes for students with ADHD begin early and persist throughout life (Loe & Feldman, 2007).

ADHD is a neurologically-based disability (American Psychiatric Association, 2013) that requires intervention to support students. Although medication may help some students with ADHD improve their focused attention, it does not have to be the primary tool to increase attention (Centers for Disease Control, 2015). When medication is used, the correct medication can take time to identify and may have negative side effects. The emerging extant research suggests antecedent gross and fine motor physical activity promotes positive educational performance and behavior for students with ADHD or similar characteristics. Fidgets, or fine motor tactile stimulation objects, which thousands of children now use as toys (Thayer, 2017), come in many forms (e.g., stress balls, cubes, and spinners) and may be useful as an inexpensive and enjoyable antecedent intervention to enable students with ADHD to self-regulate behaviors.

2. Interventions for Students with ADHD

For years, researchers have investigated interventions to assist students with ADHD in managing behaviors. Interventions vary by time of implementation (i.e., a redirection versus a
support given in advance) as well as the actual strategy or tool (e.g., visual cues versus fidgets). Antecedent interventions, strategies used to prevent unwanted behaviors, such as a daily schedule or checklist, have been found to prevent unwanted behaviors and increase self-control for students in classroom settings (Kern & Clemens, 2007). Interventions implemented prior to an observed off-task behavior (e.g., excessive body movement) could be used to prompt a replacement behavior. Studies supporting the effective use of tactile antecedent interventions include handheld manipulatives, stability balls, therapy balls, and stress balls.

Kercood, Grskovic, Lee, and Emmert (2007) examined effects of antecedent fine motor tactile stimulation with four 9-year old students with characteristics of ADHD to improve academic performance. Each student used a handheld manipulative during a 20-min independent assignment. Two students increased performance on academic tasks while using a manipulative, while the other two students’ performance did not significantly change. All students engaged in fewer off-task behaviors while utilizing fine motor tactile stimulation during instructional time.

Fedewa and Erwin (2011) investigated effects of stability balls (e.g., an inflatable fitness ball designed for balance and strengthening) on in-seat and on-task behavior for students with ADHD. They selected eight students—five with an ADHD diagnosis and three with behavioral concerns consistent with an ADHD diagnosis. Each student in the class, including those not in the study, was provided with a stability ball instead of a standard class chair. While using the stability balls, students demonstrated a statistically significant improvement in on-task (i.e., 94%) and in-seat behavior (i.e., 80%).

In a fourth grade classroom of 24 students (three with ADHD), Schilling, Washington, Billingsley, and Dietz (2003) found therapy balls (i.e., inflatable elastic ball) as classroom seats increased in-seat behavior of the students with ADHD. Following the study, participating teachers continued to use the therapy balls for all classroom students. Goodmon, Leverett, Rover, Hillard, Tedder, and Rakes (2014) also investigated the effects of therapy balls on classroom behavior of students with ADHD and dyslexia. Their focus was on the increase in desirable behaviors and decrease in undesirable behaviors of 24 fifth grade students. Desirable behaviors included looking at the teacher, asking related questions, staying in seat, and keeping hands to self. Undesirable behaviors consisted of fidgeting, getting out of seat, talking off topic, and looking away from teacher or materials. The authors found undesired behavior frequency decreased between baseline and intervention in both a control and intervention class. However, the intervention classroom demonstrated statistically significant decreases in specific
undesirable behaviors including looking away from teacher and fidgeting. Significant increases in desirable behaviors were observed in the intervention classroom. After the study, students indicated they enjoyed therapy balls more than classroom seats and said they increased academic focus.

The effects of using stress balls, or handheld soft toys manipulated by the fingers to relieve stress, was investigated by Stalvey and Brasell (2006) to reduce distracting behaviors in a sixth grade language arts class. Of the 29 students in the study, several exhibited attention difficulties, although only one had a formal diagnosis of ADHD. Stalvey and Brasell provided a variety of stress balls to all students and allowed them to choose the one they preferred. Results demonstrated decreased distractions during instruction (mean decrease from 3.4 to 0.5) and during independent practice (mean decrease from 2.5 to 0.9). Of the 29 participants, 19 reported stress balls helped them focus on writing because the balls calmed them down.

The current literature demonstrates the effectiveness of stability balls, stress balls, therapy balls, and other handheld manipulatives for helping students with ADHD improve attention. The purpose of this study is to expand upon current research by studying hand and foot fidgets that were inexpensive, easy to acquire, and minimally disruptive. The research question we attempted to answer through this study was: Does the use of a hand fidget or foot fidget increase focused attention in class during instruction in four elementary students with ADHD?

3. Method

3.1 Participants

Four participants, three males and one female, (See Table 1) ranging in age from 5 to 10 years old were recruited from a rural public elementary school in a southwestern state. The participating students met the following inclusion criteria: (a) current diagnosis of ADHD, (b) current demonstration of off-task and inattentive classroom behavior as indicated by the special and general education teachers, (c) attending the same elementary school, (d) receiving instruction in both the special and general education settings, and (e) receiving instruction from the same special education teacher for reading. Additionally, all participants required repeated verbal reminders and/or prompts from the special and general education teachers to improve attention. Prior to the study, participants were recruited using a university Institutional Review Board (IRB) approved script, parent consent form, and student assent form.

3.2 Settings

After receiving university IRB and school district approval, all activities took place at the school, which served approximately 461 pre-kindergarten through eighth grade students, 65
(about 14%) of which receive special education and related services. Twenty-three percent of the school population is eligible for free and reduced lunch. The district ethnic diversity is Caucasian (76%), Native American (15%), Hispanic (5%), Asian (3%), and Black (2%).

Participant observations were conducted during regularly scheduled instruction in the general education kindergarten (Mason), second grade (Cameron and Gerry), and fourth grade (Korey). Each participant had a different general education teacher with varying classroom configurations (e.g., rows of desks versus u-shaped desk formation) and schedules. The observations of instruction in general education environments varied based on participant and daily classroom schedules.

**Gerry’s classroom.** Gerry, an 8-year old male in second grade, received special education and related services for reading, writing, math, speech therapy, occupational therapy, and physical therapy. In a classroom of 23 students with desks situated in rows, Gerry was seated in the back row facing the front of the room. Classroom space was crowded due to square footage of the room versus student desks, teacher desk, small group table, and student cubbies/storage. The teacher facilitated instruction from the front of the room for whole group activities and from the small group table during centers.

**Korey’s classroom.** Korey, a 10-year old female, rotated to four departmentalized fourth grade classrooms. Korey received special education and related services for reading, math, writing, and speech therapy. The number of students in each section averaged 20 students in each class. Korey’s desk was in a central location in all of her subjects. Two of the classrooms were structured with individual desks in rows facing the front of the room, while the other two classrooms organized desks into small groups or a u-shape to promote collaboration. Each of the classroom environments were neat with wall coverings related to the content area. Instruction in each of these classrooms was delivered to the whole group from the front of the room.

**Cameron’s classroom.** Cameron, an 8-year male in second grade, received special education and related services for reading, occupational therapy, and speech therapy. In a classroom of 22 students sitting in a u-shape formation, Cameron was seated near the back close to the door. A wall of windows was opposite the doors, cubbies lined one wall, and the chalkboard was in the front of the room. The teacher facilitated large group instruction from the front of the room.

**Mason’s classroom.** Mason, a 5-year old male in kindergarten, received special education and related services for reading and respite. In a classroom of 25 students sitting at tables in
groups of four, Mason sat near the center of the room facing the white board. The classroom walls had lockers, cabinets, brightly colored educational materials and decorations, and a white board. There was a glass exterior classroom door allowing natural sunlight. The teacher facilitated small group and independent activities while moving throughout the room.

3.3 Materials

Two fidgets were used in this study. One fidget, the NewCool© Fidget (2017), was a handheld tube-shaped manipulative made of nylon netting with an enclosed marble. The design enables children to move the enclosed marble within the soft enclosure. Each is approximately 6 X 1.5 inches and weighs 2 ounces. The second fidget, Fidgeting Foot Band™, consists of a durable rubber band approximately 1.5 inches wide. The band wraps around the front legs of a chair and is designed to allow students to push, pull, or bounce the band with one or both feet. Additional study materials included (a) an instructional fidelity checklist, (b) the Repeat Timer PRO (2012) app for iPhones, and (c) a momentary time sampling data collection form.

3.4 Experimental Design

To control threats to the internal validity of this study, an ABAB withdrawal design was used. Baseline data (A) were collected in each participant’s general education classroom through repeated observations. The intervention condition (B) represents participants’ use of their preferred fidgets in their general education classroom after being taught how to use both fidgets in the special education classroom. The second intervention phase (B) consisted of reintroduction of the participants’ preferred fidgets. Following criteria established by Horner, Carr, Halle, McGee, Odom, and Wolery (2005), five data points were collected constituting a predictable pattern per participant, followed by the withdrawal stage of returning to baseline (A). Results were visually analyzed for level and trend changes using guidelines developed by Gast and Ledford (2014).

3.5 Dependent Measure

Percent of 10-sec intervals of attentive behavior served as the dependent measure. Attentive behavior was defined as (a) keeping eyes on instructional material or teacher, (b) keeping hands/feet to self, (c) talking appropriately on topic, (d) raising hand, (e) asking related questions, (f) not complaining, (g) remaining seated, and (h) participating in choral responses.

Interobserver agreement. Interobserver agreement (IOA) was collected twice during baseline and four times during intervention. Each researcher simultaneously watched and recorded 10-sec momentary time sampled behavior using the established data collection sheet and Repeat Timer PRO (2012) app. When researchers observed in person, they sat next to each
other facing the participants. One researcher had an iPhone with the timer set, and both researchers shared a set of ear buds to ensure data were taken at the same time upon hearing the beep for fidelity of data collection. When IOA observations were taken virtually (two times), the onsite researcher opened the video conferencing platform, Zoom© (2017), on an onsite iPad which gave the offsite researcher a full view of the participant. The onsite researcher placed the Repeat Pro Timer app in front of the iPad camera, indicating to the remote researcher when it was time to push start to ensure they began and ended their 10-second interval data collection simultaneously. The point-by-point agreement ratio (agreements divided by agreements plus disagreements and multiplied by 100) was used to calculate IOA (Kazdin, 1982).

The overall average IOA equaled 90% with a range of 85% to 93%. Agreement ranged from 85% (low) for Gerry to 93% (high) for Cameron. IOA was conducted over 24% of the data points collected (i.e., Gerry 48%, Korey 22%, Cameron 17%, and Mason 16%), and achieved agreement of 90% to ensure consensus in definition of observed behavior and accurate data collection (Gast & Ledford, 2014).

3.6 Procedures

During baseline and intervention, students were observed across all four phases in seven different general education classrooms. To capture participant attention across the day, observation times varied based on teacher instructional schedules and activities. Given the nature of ADHD, and how it manifests in off-task behavior, it was determined that varying the environment, time of day, and instructional activity in baseline and intervention conditions would provide more objective data. Baseline and intervention data was collected using a momentary time sampling form developed by Tieghi-Benet et al. (2003) modified to record data in ten intervals of ten secs each. The Repeat Timer PRO (2012) app with a looping function was used to alert researchers to look up at participants every ten secs and document attentive behavior. During the remaining seconds until (independent or group) was occurring during the next beep, researchers looked at their recording form. During each observation, up to 20 mins of data in ten intervals of 10-sec each was collected for each participant. Executive decisions were made regarding when to observe students and collect data to ensure instruction was taking place or student-level work observations. In one instance, during a scheduled observation time, a class was watching a movie, so observations were rescheduled. Additionally, there were times, such as transition times, when data collection Baseline. Data for each participant was collected according to each of their school schedules and assigned instructional time in the general education classroom. Teachers were asked to operate under “business as usual” conditions
during observations, which would include following their typical daily schedules, routines, expectations, and levels of support. For example, in one second grade classroom, the teacher typically stands behind her podium as she addresses the class and calls on students in order by row so students know when their turn is coming. The expectation during observations is that she would continue in typical fashion. would be temporarily suspended.

3.7 Intervention

Once a stable was baseline established for each participant, they were taught how to use the hand and foot fidgets during a group meeting in the special education classroom. Each participant received 20 minutes of group instruction on how to use each fidget. Participants were provided a detailed explanation of the nature of the fidget as a tool and not a toy and discussed how fidgets help students become better at listening, calming down, focusing attention in class, and how they can be used with one or two hands/feet. Suggestions for manipulating the fidgets were modeled, and rules were established for each fidget, including: (a) fidgets must only be used to enhance focus; (b) fidgets must be used as instructed and for the intended purpose; (c) fidgets must not distract others; and, (d) fidgets must remain silent.

Prompts to encourage proper fidget use included a verbal prompt and reminder of how to use the fidget with modeling, followed by hand-over-hand modeling. Appropriate task-specific praise or visual cue (e.g., verbal encouragement or a thumbs up from teacher) was offered when the participant used the tool appropriately. Participants were verbally reminded by name when not using the tool appropriately, followed by instruction for the participant to set the fidget on the desk for two minutes. Participants picked up the fidgets again with a brief verbal reminder on appropriate use. The participants used fidgets correctly except one instance when a participant needed a verbal prompt and immediately began using the fidget as instructed. Participants chose their preferred fidget to use during each intervention observation. Three of the four participants chose the hand fidget as a preferred tool, and one chose the foot fidget. Participants were able to change fidgets if desired; however, three of the four participants always used the initial fidget of their choice (i.e., hand fidget), and the one participant who changed fidgets returned to original choice (i.e., foot fidget).

3.8 Instructional Fidelity

A formal measure of treatment fidelity was used during instruction on the use of fidgets. The instrument is a checklist modeled after one developed by the RTI Classification Tool and Resource Locator (n.d.). The checklist enabled documentation of the established procedures followed throughout the study, including guidelines for using fidgets and instructional
The checklists consisted of 36 steps across baseline and intervention stages. Instruction on the use of the fidgets occurred in pairs of participants on two separate days, while a third-party observer watched the instructional researcher and checked to determine if the steps were implemented correctly in each training session. All steps were implemented correctly with an overall quality implementation score of 100%. The instructional researcher sat with participants during the training sessions, modeled correct usage of fidgets, outlined expectations, had participants repeat expectations, and allowed each participant the opportunity to manipulate fidgets as instructed.

Throughout the study, instructional fidelity data was collected for each participant by documenting attention/inattention on the data collection sheets. A condensed version of the 36 steps was used as a reference to ensure consistent definitions and expectations during data collection. Documentation also included (a) what participants were doing when they were off-task (e.g., talking to neighbor or looking at researchers), (b) which fidget participants chose, (c) that participants actively used fidgets during all intervention observations, and (d) when a participant was not using the fidget as instructed and what steps were taken to correct behavior.

4. Results

Intervention and baseline data on attentive behavior was collected during five to seven sessions per participant for a total of 23 sessions using ten-sec momentary time sampling during instruction in the general education classroom with varying lengths of time as conditions permitted. As depicted in Figure 1, Korey and Mason had stable baselines, Gerry had an increasing baseline, which then stabilized, and Mason had a decreasing baseline, where percent of attentive behavior neared 10% on the last two sessions. Immediately following introduction of the intervention, level changes occurred for all participants with increases of 80% to 100%, which stayed higher than baseline even as performance became more variable. During return to baseline, all participants demonstrated a drop in performance, yet slightly higher than original baseline levels. The return to baseline again demonstrated level changes of 80% to 100%, and results for the remaining return to intervention data points stayed high for all participants, although performance did fluctuate. Results for each participant are presented, followed by discussion of the calculated percent of non-overlapping data (PND) effect size statistics.

4.1 Cameron

During baseline, Cameron’s attentive behavior remained stable and ranged between 30% to 40%, with the second data point dropping to 10%. A noticeable level change and an
increasing trend line resulted immediately following introduction of the fidget. Except for the fourth intervention data point, which dropped to about 60%, Cameron’s attention remained between 80% and 90%. Return to baseline resulted in an immediate drop below initial baseline levels, followed by a sharp increase to near intervention levels and remained at this level for the rest of the return to baseline phase. Re-introduction of the fidget resulted in an increasing trend line to 100%, which then stabilized at an intervention level between 80% and 90%. The unexplained increase at the end of baseline two was not considered to be a large concern by the researchers due to the overall trend of low attention during baseline and high attention during intervention.

4.2 Gerry

During baseline, Gerry’s attentive behavior began at 10% to 20%, then stabilized at 30% to 50%. A noticeable level change and an increasing trend line resulted immediately following introduction of the fidget. Attentive behavior during the first intervention remained between 70% and 100%. Return to baseline resulted in an immediate drop of performance with a slow increase including one overlapping data point, followed by a sharp decrease at the fourth data point to below initial baseline levels. Re-introduction of the fidget resulted in an increasing trend line to 90%, which then stabilized around 70%. The data collection for Gerry represents experimental control with reservation due to trends in initial baseline and intervention phases.

4.3 Korey

During baseline, Korey’s attentive behavior was stable at 30% with the exception of the fourth data point at 40%. A noticeable level change and an increasing trend line resulted immediately following introduction of the fidget. Attentive behavior during the first intervention remained between 90% and 100%. Return to baseline resulted in an immediate drop of performance with an erratic upward pattern increase to 70%. Re-introduction of the fidget resulted in a stabilized trend line around 90%.

4.4 Mason

During baseline, Mason’s attentive behavior remained generally stable and ranged between 40% to 50%, with the fourth and fifth data point dropping to 10%. A noticeable level change and an increasing trend line resulted immediately following introduction of the fidget. Except for the fifth intervention data point, which dropped to 60%, Mason’s attention remained between 80% and 100%. Return to baseline resulted in a drop of performance below intervention level, followed by a stable trend line around 50%. Re-introduction of the fidget
resulted in an immediate increase in trend line to 100%, which stabilized at an intervention level around 90%.

The percent of non-overlapping data (PND) was calculated for all participants, and Scruggs scale of effect size (i.e., 90% very effective, 70-89% effective, less than 70% questionable or ineffective) was used (Scruggs & Mastropieri, 2013). Results for Mason and Korey produced 100% PND effect size findings, which suggests the fidgets served as very effective interventions. The PND result of 80% for Gerry and 70% for Cameron suggest an effective intervention. These effect size findings support the visual analysis of the results and provide a quantitative means to gauge the effectiveness of fidgets for the four participants.

4.5 Discussion

The overall attentive behavior for all participants increased with the intervention of the fidgets. All intervention phases showed an increase in attentive behavior over baseline percentages. Although there were some overlapping data points for Cameron and Gerry, there were not enough to change the level and trend of the data. Marked drops in attention during intervention for Mason and Cameron were due to external factors, such as classroom disruptions; while, for Korey and Cameron, sharp increases in attention during baseline were caused by individual instruction or proximity of teacher to the participant.

The ABAB withdrawal design used in this study demonstrated a functional relation between independent and dependent variables in that participant behavior (i.e., attentive behavior) changed when fidgets were introduced, reversed when fidgets were taken away, and improved when fidgets were reintroduced. Providing participants with two opportunities to use the intervention strengthened the internal validity of the findings.

The results from this study align with those of other researchers who explored using tactile stimulation to increase focused attention (Goodmon, Leverett, Rover, Hillard, Tedder, & Rakes, 2014; Schilling, Washington, Billingsley, & Deitz, 2003). Similar to Goodmon, et al. (2014) researchers observed more desired behaviors (e.g., eyes on teacher) through the use of tactile stimulation objects. Findings are consistent with previous research showing benefit from the use of a physical manipulative in the classroom for children with attention issues.

All participants fully engaged in using a fidget when made available to them during intervention and followed instructions for correct usage, with one exception that resulted in a verbal reminder. Observational data revealed each of the participants improved their attentive behavior in the classroom in socially acceptable ways. Improvements were observed across
participants in behaviors, such as staying in seat, not engaging in off-topic conversations, and attending to instruction through eye contact with teacher or materials.

Currently, minimal research has been conducted studying the effectiveness of these specific hand and foot fidgets as interventions for increasing focused attention in class for students with ADHD. Most research has been conducted on the use of therapy balls or stress balls (Kercood et al., 2007; Stalvey & Brasell, 2006; Fedewa & Erwin, 2011; Goodmon et al., 2014). Findings from this study expand the current knowledge base on the use of inexpensive hand and foot manipulatives as tools to effectively increase focused attention for students with ADHD or similar characteristics.

Fidgeting in seats may be distracting to classmates (Stalvey & Brasell, 2006). The use of the hand fidget or chair band foot fidget is socially acceptable and allows students with attention difficulty to expend energy in ways that will not disrupt others (Stalvey & Brasell, 2006). This might explain why 100% of parents were eager to consent for their child to participate in the study. During recruitment, parents expressed a desire for their children to have opportunities to help improve attention in class. Parents verbally recognized challenges their children were having and viewed the intervention as having a potential positive impact. Participants were excited to give assent to the study and demonstrated a desire to begin using fidgets in the general education classroom. During the withdrawal phase, all participants requested to use the fidgets.

Observations reflect that typical peers did not comment on (nor was attention drawn to) the use of the fidgets. Social validity of the fidgets was demonstrated by unsolicited requests made by two teachers following observation of the participant during an intervention phase. Gerry’s teacher inquired as to if Gerry could continue to use the fidgets at other times due to his increase in attention observed during small group reading instruction. Mason’s teacher inquired about access to the fidgets following the study. Participants verbally expressed a desire to learn to use the fidgets and continued to express excitement over the use of the fidgets throughout the phases. The implementation of fidgets as interventions align with Wolf’s (1978) interpretation of socially appropriate treatments based on ethics, cost, and practicality.

One researcher was a special education teacher in the school, and the other worked and lived approximately one hour away from the school. Scheduling onsite observations was a challenge due to conflicting schedules and distance; therefore, in addition to the onsite, in-person observations conducted by both researchers, the researchers used the video conferencing platform Zoom© (2017) twice to allow Interobserver Agreement (IOA) to be collected.
simultaneously while one researcher was at the school, and the other was at a remote location. This demonstrates a true benefit of modern technology.

### 4.6 Limitations and Suggestions for Future Research

The primary limitation of the study is lack of time to comprehensively conduct the study. Study duration from baseline through withdrawal phase was three weeks. Some participants’ last data point rose during baseline; however, since the researchers were observing a predictable pattern in their attention, the intervention was introduced due to time constraints. The researchers would have preferred to extend the baseline and intervention phases in the general education classroom for another replication, followed by additional weeks of maintenance. Greater time would have allowed (a) more time for participants to get comfortable using the fidgets, (b) for the novelty of the fidgets to wear off, and (c) for additional data points to be collected.

Although all four participants showed increases in attentive behavior, caution is necessary in generalizing findings to larger groups due to unique characteristics of each student and the few participants in the single case study. While the hand and foot fidget are commercially available, other items may serve as fidgets for the purposes of attentive behavior. For example, rubber bands, marbles and other tactile items may be useful for students to manipulate. Future research should investigate methods for focusing attention using easily attainable items. An additional limitation is lack of diversity in race and ethnicity, which could be studied in the future.

Each academic subject observed varied by participant, teacher, and classroom schedule; however, some teachers did not operate as they normally would and changed activities or schedules to meet the perceived needs of the study, which may have affected the participants’ attending behavior. For example, some teachers transitioned to direct instruction from independent assignments upon observation. It was also noted that more individualized attention was given to study participants than what is typical. Changes in participant behavior were observed when teachers provided one-on-one assistance to participants versus when instructors facilitated whole group instruction.

To encourage the use of hand or foot fidgets, a cost benefit analyses should be conducted to determine if fidgets would improve focused behavior while producing improvements in academic performance or if other tools, such as therapy balls or moving seats, might prove to be more effective to support students with ADHD. Time was insufficient to allow participants to use both fidgets to determine whether one fidget was more effective than the other.
Additionally, three of the four participants preferred the hand fidget over the foot fidget, which did not provide an opportunity for researchers to extensively observe the effect of the lesser chosen fidget. Future research could focus on determining the effectiveness of each fidget on focusing attention.

Future research should be conducted to determine the best way to sustain attention over time. This study allowed participants to use fidgets during intervention. Additional research is needed to determine if the use of fidgets fades over time while focusing attention. Another area to explore is if focused attention could be maintained over time with periodic use of a fidget.

4.7 Implications for Practitioners

Using evidence- and research-based interventions for students with ADHD is essential. Practitioners should adhere to this principle while continuing to investigate other ways of supporting students in school. Research has established that providing tactile stimulation for increasing attentive behavior is an evidence-based practice (Fedewa & Erwin, 2011; Stalvey & Brasell, 2006). Based on the preliminary findings of this ABAB study, further research should be conducted on a larger scale to determine the effectiveness of using fidgets during classroom instruction for students with ADHD, or those exhibiting off-task and inattentive behavior.

5. Conclusion

Using tactile stimulating devices, such as hand and foot fidgets, to help students with ADHD increase focused attention is a promising practice. The present study added to the research base in the area of focused attention and ADHD. Results contribute to an increased understanding of available tools for helping students expend energy in a socially appropriate way in the classroom, identified areas where additional research is needed, and offered recommendations for practitioners wishing to utilize similar fidgets.

Tools, forms, and data can be accessed by emailing xxxxx@xx.xxx.

References


### Table 1: Participant Information

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<th>Name</th>
<th>Age</th>
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