

Abstract

EFFECTS OF ALTERNATIVE SEATING ON THE ACADEMIC ENGAGEMENT OF  
CHILDREN WITH AUTISM

by

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Students with sensory integration deficits may display a hyper or hyposensitivity to sensory information and lack the ability to modulate that input in socially appropriate ways. Therapy balls as a sensory integration intervention has shown positive results for use with fourth grade students with attention deficit hyperactivity disorder and preschool children with autism. Therapy balls were used to improve classroom behavior and improve student engagement to relevant materials and persons. Therapy balls are large, inflatable balls, often used for exercise. This form of intervention is thought to afford students with autism who may have deficits in their ability to modulate sensory input the chance to do this in an appropriate way. Students can bounce or roll on the ball which aids in sensory modulation without being disruptive to instruction. The current study replicated the Schilling and Schwartz (2004) study with high school students with autism in a self-contained class. The study examined the effects of therapy balls as seating on in-seat behavior and on-task behavior. Momentary time sampling was used to ascertain the percentage of time that each participant is in-seat/on-ball and on-task/academically

engaged. Participants were recruited from a local high school self-contained class for students with autism and include one male and one female student. Single-case design methodologies were used to examine the results. For each participant, data was collected in four phases, two using typical seating and two using the proposed intervention.

Participant's data indicate that the therapy ball intervention was initially helpful in improving on-task behavior but that improvement was not replicated after a withdrawal of the intervention. For both participants, in-seat behavior remained appropriate and was therefore, not the focus of this intervention.

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OF CHILDREN WITH AUTISM

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## CHAPTER I: INTRODUCTION

The prevalence of autism has reached approximately 1 in 150 children (National Center on Birth Defects and Developmental Disabilities, 2008). It is the second most common childhood disorder and has increased its media presence, in part due to the increase in demand for interventions. As more children with autism enter school, there is increased demand for schools to meet the special needs associated with this unique disorder.

Autism is a pervasive developmental disorder that affects children and adults through impairments in communication, social interaction, and maladaptive patterns of behavior. Individuals with autism have social interactions that include inappropriate or absent nonverbal behaviors or a failure to develop social relationships. Communication impairment can range from total lack of language use to an inability to appropriately initiate or maintain conversation. Finally, individuals with autism may exhibit behaviors that are repetitive or stereotyped, as well as interests that are highly restricted (American Psychological Association, 2000).

Children with autism also display weaknesses in a variety of areas related to school performance, such as academic engagement. Academic engagement is the amounts of time students appropriately interact with the academic environment (McWilliam & Bailey, 1995). This may be attending to the instructor, the instructional materials, other relevant individuals or objects. Academic engagement, therefore, can be described as appropriate on-task behavior. On-task behavior involves attending to relevant materials and individuals during instruction in order to result in greater academic

achievement and success. It also involves appropriate in-seat behavior during academic instruction. Academic achievement is enhanced by student engagement in instruction that results in positive academic feedback (need citation).

Sensory integration is another common issue for children with autism. Sensory integration is the individual's ability to tolerate and regulate the sensory stimuli one receives in order to manage the environment effectively (Gilman, 2005). Among typically developing children, sensory integration is a developmental skill that becomes increasingly developed with age. Children with autism, however, often suffer from hypersensitivity or hyposensitivity to tactile sensation, which can interfere with the development of important socio-emotional and motor skills. (Waiting, Henry, & Miller-Kuhaneck, 2006). Children with autism also may display self-stimulatory behaviors as an effort to regulate their sensory input (Koegel & Cover, 1972). As a result, children with autism are distracted by their need to regulate the sensory environment through behavior that is socially inappropriate and academically incompatible.

Thus, problems with both academic engagement and sensory integration are common to children with autism. More importantly, these two deficits may be linked (Roberts, King-Thomas, & Boccia, 2007; Schilling & Schwartz, 2004; Watling, Bodison, Henry, & Miller-Kuhaneck, 2006). Sensory integration difficulties may be an underlying protagonist for disruptive behaviors in the classroom, such as off-task behavior or inattention (Schilling & Schwartz, 2004). On-task and in-seat behavior, which contributes to overall academic engagement, may be improved as a function of improvement to sensory integration. Sensory integration deficits have been linked to other poor classroom

behaviors, such as disruptive or aggressive behavior and inattention (Roberts, King-Thomas, & Boccia, 2007). Therefore, if sensory integration improves many aspects of engagement in the classroom may also improve.

### *Interventions for Autism Spectrum Disorder*

Many research efforts have been directed towards improving either sensory integration or in-seat behavior for children with autism. Therapy programs such as sensory integration therapy, auditory integration therapy, and sensorimotor and visual integration therapies have been developed with mixed research support (Dawson & Watling, 2000). Various applied behavioral techniques have been used to address in-seat behavior. Many of the studies, however, have methodological weaknesses, such as small sample sizes, lack of a control group, or insufficient duration of the intervention to assume that positive effects could be contributed to the above interventions (Dawson & Watling). As a result, additional study is important to ascertain of the efficacy of therapies that target aspects of sensory integration as well as classroom behavioral concerns.

One intervention has been used to improve academic engagement and in-seat behavior in children with autism via targeting sensory integration (Schilling, Washington, Billingsley & Deitz, 2003; Schilling & Schwartz, 2004). A simple intervention was developed to assist children in regulating their sensory input thus increasing their engagement in classroom activities and the time that they remain seated for instruction.

Therapy balls, originally suggested to improve the back health of school-age children, were anecdotally found to improve children's attention and engagement in

classroom activities (Schilling et al., 2003). Therapy balls are large, inflatable balls often used for exercise. The effect of therapy balls on student engagement and in-seat behavior were first examined in children with attention-deficit hyperactivity disorder (Schilling et al., 2003). The research was then expanded to include preschool children with autism (Schilling & Schwartz, 2004). The balls were fitted in each study to allow the students to rest comfortably with their backside on the ball and their feet on the floor. Students may roll or bounce on the ball, which is thought to afford them enough sensory input to satisfy those with a hyposensitivity to tactile input that normally causes them to seek out stimulation (Gilman, 2005). Likewise, those with a hypersensitivity to tactile input that results in self-injurious or self-stimulatory behaviors are provided an opportunity to express stimulation in an appropriate fashion (Kern, Garver, Carmody, Andrews, Mehta, & Trivedi, 2008).

The rationale, therefore, was that if children with autism are given the chance to appropriately and sufficiently regulate their sensory input, they would be better able to attend to the relevant activities of the classroom. In-seat behavior also improved in both studies using therapy balls with children with disabilities. Teachers commented that students appeared to enjoy the alternative seating and would usually show a preference for the therapy ball if given the choice. Therefore, children with a preference for a particular method of seating are more likely to remain seated.

Schilling, Washington, Billingsley, and Deitz (2003) examined the effect of therapy balls on academic engagement and in-seat behavior in fourth-grade children with attention-deficit hyperactivity disorder. Both in-seat behavior and work production

improved during the times when the intervention was implemented as compared to times when typical seating was used. Schilling and Schwartz (2004) found similar improvements in engagement and in-seat behavior in a small group of preschool students with autism.

### *Statement of the Problem*

Although the majority of research available on this alternative form of seating points to the efficacy of this intervention, there are some weaknesses in these studies. Both studies of therapy balls as alternative seating used a single-subject design to examine the effects of the therapy balls. While single-subject research is an excellent way to examine interventions, there is a small sample size and therefore it is difficult to generalize the findings to the overall population. Research overcomes the issue of small sample size through replication, thus accumulating evidence for or against the efficacy of an intervention. In light of these limitations, further research is essential to ascertain the efficacy of an intervention.

This study seeks to replicate the results of Schilling and Schwartz (2004) and Schilling, Washington, Billingsley, and Deitz (2003) using single-subject design. The previous studies' examination of the use of therapy balls points to a parsimonious and socially valid intervention for children with autism. Further research could establish this intervention as evidence-based to be used by school psychologists and other practitioners.

*Research Questions*

There are three research questions addressed in this study:

1. Are therapy balls as alternative seating effective in improving in-seat behavior in children with autism?
2. Are therapy balls as alternative seating effective in improving on-task behavior in children with autism?
3. Do teachers view this intervention as feasible and acceptable?



## CHAPTER II: LITERATURE REVIEW

### *Academic Engagement*

Research has demonstrated that a relationship exists between student engagement and academic achievement (Newmann, 1992). In order to understand this relationship, engagement must be sufficiently defined. Researchers have coined a variety of definitions of engagement. Newmann (1992) considered student engagement as a “psychological investment in learning” with a marked effort made towards learning and mastering new skills (Newmann, 1992, p. 3). Finn and Voelkl (1993) consider student engagement to be synonymous with participation in the classroom and various school activities. Therefore, student engagement may refer more specifically to a student’s behavior and feelings towards the school climate as a whole. Finally, McWilliam and Bailey (1995) view student engagement as being defined by the student’s time spent interacting with the environment in appropriate ways. The present study adopts Schilling and Schwartz’s (2004) definition of engagement, which is similar to on-task behavior and includes the orientation of the student to classroom activities, the teacher, or contextually relevant materials as well as in-seat behavior during instructional periods. The language used for the present study, therefore, will refer to academic engagement as on-task behavior in the context of direct instruction.

### *Academic Engagement and Autism*

The present study focuses on the effects of an intervention on the on-task behavior of students with autism spectrum disorder. While student engagement and academic achievement have been linked for non-disabled students, researchers

McWilliam and Bailey (1995) focused on the effects of disability on student engagement. The researchers found that, as with typically developing peers, engagement improves as developmental age increases, but, overall, students with disabilities engage for shorter amounts of time than students without disabilities (McWilliam & Bailey, 1995). This vulnerability is the focus of the present study with an effort to identify ways to moderate the effects of autism on student success in the classroom.

Many methods have been developed and continue to evolve to meet the needs of children with autism. Since the 1980s, there has been more emphasis on early intervention to improve behavior and long-term outcomes for children with autism. Intensive Behavioral Treatment is also commonly referred to as Behavior Therapy or Applied Behavioral Analysis. This approach involves up to 40 hours per week of intense one-on-one behavioral therapy combined with parent training and mainstreaming with typical children that begins in toddler hood and continues for at least two years. Researchers McEachin, Smith, and Lovaas (1993) looked at the long-term effects of a 1987 trial of this form of treatment and found that children who had participated enjoyed long-term benefits such as an increased IQ and less restrictive placement in school, as well as increased language and social skills and reduced aggression. Behavior Therapy involves making strict adjustments to the environment and control of the environmental consequences to produce change in the child. Therefore, children with autism receive immediate feedback about their behavior from their environment. They receive this treatment in toddler hood as they develop their early social skills (Lovaas, Koegel, Simmons, & Long, 1973).

TEACCH or Treatment and Education of Autistic and related Communication-handicapped Children, and its techniques are commonly used in the classroom to improve student performance. TEACCH is a comprehensive approach to educating and interacting with children and adults with autism. TEACCH involves not only techniques for the classroom but a philosophy on how to treat and view autism. This philosophy attempts to understand the experience of individuals with autism and capitalize on their inherent strengths. TEACCH views autism as a culture as well as a disability that affects every facet of an individual's life and functioning. TEACCH emphasizes on-going assessment, family collaboration, and utilizing individual strengths and interests (Mesibov, Shea, & Schopler, 2004). One way in which to capitalize on the nature of autism is to build on the individual's desire for routine by using checklists and schedules to accomplish goals and acquire skills. Within the classroom, TEACCH encourages structured teaching of individual goals while using the individual's interests and strengths to drive teaching methods. This may mean providing information visually rather than through auditory input. These methods involve a flexibility and individuation while appreciating the nature of each individual in the context of their disability (Mesibov, Shea, & Schopler, 2004).

#### *Interventions Directed at Classroom Functioning of Students with Autism*

In order to maintain appropriate behavior and task engagement in the classroom, one method commonly used is picture activity schedules. Children with autism have been documented to have difficulty remaining on-task and making transitions between activities. Children with autism have difficulty with these activities as a result of their deficits in interpreting environmental cues efficiently. Therefore, their behavior remains

inconsistent and often incompatible with the classroom environment. Activity Schedules, often pictures to represent activities, provide visual prompts that show a sequence of activities to be accomplished. This method aids with transitioning as it allows children with autism to predict future events and understand expectations with less prompting by adults (Bryan & Gast, 2000). This method has shown success with both low and high functioning children with autism in improving on-task and on-schedule behavior (Bryan & Gast, 2000).

Another commonly used intervention to improve students with autism's behavior and performance in school is choice making. Choice making is allowing a student with autism to choose from a selection of activities. This allows the student to become more invested in the activity of choice (Morgan, 2006). This intervention has been found to increase task engagement, reduce problem behaviors in the classroom, and improve academic performance of the chosen activity (Morgan, 2006).

Likewise, preference can be used to increase appropriate behavior and reduce problem behavior in students with autism. This involves allowing the student to engage in activities or involve materials in an activity that is more reinforcing. By providing reinforcing materials or activities, students with autism are more likely to comply with aspects of the activity and be more productive (Morgan, 2006). When comparing preference and choice-making, the results show that individual differences may affect the success, as some studies showed more positive results for preference techniques than choice-making and vice versa (Morgan, 2006). These results indicate that flexibility and individuation may be necessary in educating students with autism.

### *Sensory Integration and Academic Engagement*

Sensory integration theory may partially explain the poor engagement/lack of on-task behavior in children with autism. Sensory integration theory is a comprehensive theory of how individuals input, modulate, interpret, and use sensory information to function effectively in the environment (Gilman, 2005). This theory suggests that the function of various sensory systems (e.g. visual or tactile) affects the development of many important skills. The dysfunctional use of sensory systems can result in poor emotional development and regulation, poor occupational skills, and poor motor development (Watling, Henry, & Miller-Kuhaneck, 2006). Other negative outcomes of poor sensory processing include disruptive or aggressive behaviors, attention difficulties, and low IQ scores (Roberts, King-Thomas, & Boccia, 2007). These behaviors can have adverse effects on a student's functioning within the classroom environment.

Sensory integration theory looks to specific sensory systems that are key to interpreting and using sensory information to the benefit of the individual. In the case of the tactile system, the affects of which are frequently seen in children with autism (Ben-Sasson et al., 2007), dysfunctional use can result in hyper- or hyposensitivity (Gilman, 2005). Hypersensitivity to tactile input can result in avoidance of tactile experiences and poor motor responses. Hyposensitivity to tactile input can result in the individual needing, "additional, stronger, or more frequent tactile input as a way of regulating their arousal level" (Gilman, 2005, p. 196). The effects of proper sensory integration filter all the way to academic learning and success through the successful use of sensory and perceptual systems that result in behaviors conducive to learning (Gilman, 2005).

Ultimately, sensory integration acts as a foundation for the development of skills that increase the individual's success in the academic and social environment (Wating et al., 2006; O'Neill & Jones, 1997).

Well-functioning sensory integration results in the individual's ability to produce adaptive and appropriate responses based on sensory information, often referred to as sensory modulation (Ben-Sasson et al., 2007). Sensory modulation is the ability to regulate sensory information (Kern et al., 2008). Behavioral patterns that individuals with deficits in sensory modulation exhibit can range from avoidance of sensory information to seeking out sensory information (Ben-Sasson et al., 2007).

Various studies have demonstrated the existence of sensory hyposensitivity and hypersensitivity patterns in young children with autism. Ben Sasson and colleagues (2007) reiterate that extreme negative patterns of sensory modulation exist in children with autism with a marked level of sensory hypersensitive behaviors. As a result of these patterns, sensory modulation dysfunction is thought to influence self-injurious behaviors and other undesirable behavior in children with autism (Kern et al., 2008). In an effort to regulate arousal levels and the intensity of sensory information, children with autism are thought to engage in self-stimulatory behaviors that are repetitive or stereotyped (Ben-Sasson et al., 2007; Dawson and Watling, 2000; Schilling and Schwartz, 2004). Self-stimulatory behaviors include such repetitive behaviors as rocking or hand flapping which can result in the child hyper attending to these behaviors and ignoring other aspects of the environment (Koegel and Covert, 1972). Researchers Koegel and Covert (1972) and Celiberti, Bobo, Kelly, Harris, and Handleman (1997) suggest that self-

stimulatory behaviors may interfere with the child's learning and acquisition of new behaviors and skills.

Academic engagement is essential to the academic environment, and poor sensory integration is suggested to negatively affect academic engagement. For example, Roberts, King-Thomas, and Boccia (2007) examined sensory integration therapy and its effects on various behaviors. Levels of task engagement were found to increase when sensory integration therapeutic interventions were implemented. This study suggests a relationship between engagement and sensory integration and the effects on the learning environment.

#### *Interventions Directed at Sensory Integration*

As a result of the negative outcomes of poor sensory modulation and consequent self-stimulatory behaviors, many interventions have been developed to help children with autism compensate for these issues. Evidence remains mixed for the efficacy of various forms of sensory integration therapy. Most studies examining the efficacy of the intervention involved small sample sizes, no control groups, and short durations of intervention implementation (Dawson & Watling, 2000). Sensorimotor, auditory, and visual integration therapies have showed mixed results at best. One intervention targeting self-stimulatory behaviors and overall sensory integration ability has demonstrated promising results. Physical exercise has been used to improve self-stimulatory behaviors as both a method of punishment related to the behaviors and as an antecedent intervention for children with autism (Celiberti et al., 1997). Though the evidence is promising,

further replication with larger sample sizes and consistent use is needed to fully support the intervention.

The link between sensory integration difficulties and lack of task engagement in children with autism suggests a need for researchers to identify parsimonious, efficacious, and feasible interventions. The present study examines whether on-task and in-seat behaviors (behaviors conducive of learning and academic achievement) can be positively affected by providing children with autism a way of successfully modulating their sensory arousal. This rationale was developed based upon two studies: Schilling, Washington, Billingsley, and Deitz (2003) and Schilling and Schwartz (2004). Both studies examined the efficacy of an alternative seating intervention for children with autism or attention-deficit hyperactivity disorder (ADHD). The use of therapy balls as alternative seating was used to provide students with an opportunity to modulate sensory information in a manner that was appropriate and effective enough to allow the student to adequately attend and remain seated in the classroom.

The therapy ball intervention originated in Switzerland where researchers were examining the effects of this form of seating on the back health of young students (Schilling & Schwartz, 2004). Along with evidence of improved posture and back health, researchers received anecdotal accounts of improvements in attention, seating behavior, and overall school performance (Schilling et al., 2003). Researchers, therefore, shifted from a focus on back health to the effects of this intervention on variables key to academic achievement.

*Evidence for Use of Therapy Balls to Increase Academic Engagement*



Schilling et al. (2003) first examined the effects of therapy balls on writing productivity and in-seat behavior in children with ADHD. This first study found that the use of therapy balls showed promising results for students struggling to remain on-task enough to perform adequately in language arts instruction and in their seat during classroom activities (Schilling et al., 2003). Researchers examined the effects of this alternative seating on three fourth grade students with ADHD through the use of this seating with the entire class during language arts. Two variables were examined, in-seat behavior and legible word productivity compared to the class mean. All three participants showed improvements in their in-seat behavior as well as the amount of written work produced appropriately (Schilling et al., 2003).

To expand on this early research, Schilling and Schwartz (2004) used this form of intervention to improve engagement and in-seat behavior in children with autism spectrum disorder. This study utilized therapy balls as alternative seating for four preschool boys with autism to improve engagement and in-seat behavior. One participant's oppositional behavior was also examined. Data on these variables were collected three times during each school week during target activities in which participants had teacher-reported difficulties with engagement, in-seat behavior, and/or oppositional behavior. Data was collected using momentary time sampling of 10-second intervals. Each participant's academic engagement and in-seat behavior varied and was therefore observed during differing activities. For example, one participant's target activity was circle time while another's was during art activities in the extended day program. Data collection sessions ranged from five to ten minutes depending on the

length of the activity. This study utilized an ABAB design as well as a BAB design for one participant.

To ensure that the intervention could be adequately monitored, all teacher activities remained the same as well as methods of discipline used within the classroom. Data was collected during the target activity, which occurred each school day, and intervention sessions were implemented for two school weeks. Data was collected on the in-seat and academic engagement behavior of the four male participants. In-seat behavior was defined as any part of the participant's backside in contact with the ball or seat as well as one foot on the floor. For both the therapy ball and typical seating, all portions of the bottom of the method of seating must have been in contact with the floor. Academic engagement was defined as the participant's orientation to the classroom activity and all those relevant to the activity. One participant's oppositional behavior was monitored through a frequency count of refusals to follow a teacher provided request resulting in a consequence.

Two of the four participants had in-seat behavior as low as 0 percent during baseline and/or withdrawal phases. Academic engagement was also low during these phases for most participants. In-seat behavior, for three of the four participants however, provided the lowest percentages compared to academic engagement behavior. Results indicate that both variables, however, improved when the therapy ball intervention was used and reduced in its absence. For the participant whose oppositional behavior was monitored, no warnings were issued when the intervention was utilized. In the absence of the intervention, however, this participant's warnings increased significantly.

The results of the study showed further support for the use of therapy balls to improve classroom behavior. Researchers also probed the social validity of this intervention with teachers to determine how effective and feasible the intervention was perceived to be by teachers. Overall, participants in this study showed improvements in engagement and in-seat behavior as well as oppositional behavior, thus contributing to the evidence base for this intervention.

### *Single-Subject Research*

The current study utilizes single-subject research to examine the effects of this intervention on individual students. There are many benefits to single-subject research that larger studies may lack. Single-subject research is essential to those in the school, such as school psychologists, whose aim is to identify interventions that are beneficial for individual students (Riley-Tillman & Walcott, 2007). Although single-subject research lacks strong external validity, this is not the primary aim of implementing research in the schools as it is for research purposes. Single-subject research lacks a control group in which to compare the results of participants in the experimental group, the studies' designs accommodate this issue by using baseline data and removal of the intervention.

The present study seeks to provide further support for this intervention through replication and expansion. The present study replicated the design of Schilling and Schwartz (2004) by using two participants of an older age. For this study, momentary time sampling was used to monitor similar variables using the same definition. Intervals used were increased slightly to 15 seconds. The intervention phases were carried out over three days during just one school week as opposed to two. For each intervention phase

however, six data collection sessions were conducted. The present study's hypothesis is that academic engagement for students with autism spectrum disorder, as demonstrated by on-task and in-seat behaviors, will increase when they are seated on therapy balls relative to when they are seated on traditional school chairs.

## CHAPTER III: METHOD

### *Participants*

Participants included two students receiving special education services under the NC DPI autism category and served within a self-contained classroom for students with autism. One male and one female student participated in this study. The names of these students have been changed to assure their privacy and anonymity.

Sarah, a seventeen-year-old high school student, was diagnosed with autism in 2002 at the age of 10 years. Her last assessment in 2005 showed that Sarah currently functions cognitively in the moderate to severe range. Her adaptive skills also fell in the extremely low range in all domain areas. Further complicating Sarah's functioning is a documented traumatic brain injury in 2002, which resulted in absence from school for several months. Her previous teacher reported that Sarah had difficulty maintaining skills post injury. Sarah's strengths include the ability to follow one to two step directions, identifying the letters in her name, and communicate by answering yes or no to questions. Sarah's current teacher reported that she often falls asleep in class, leaves her chair, and rarely remains on-task. Her teacher identified morning group as an academic activity in which on-task behavior needs improvement.

John, an eighteen-year-old high school student, was diagnosed with autism in 2003 at the age of 12 years. John has a comorbid seizure disorder that resulted in some absences during the course of this study. John's cognitive ability is estimated to fall in the below average range. John's achievement scores also fall in the low range. John's estimated adaptive behavior is similar to that of a three year old. John's strengths include

responding to humor and praise and following directions. John's teacher reported that he struggles to remain on-task during morning group though his in-seat behavior is not a concern.

### *Recruitment*

Teacher and parent consent were obtained for each participant prior to data collection. A school psychology practicum student consulted with the teacher of the self-contained autism classroom to describe the intervention study and obtain teacher consent. The teacher nominated four students that had difficulties in academic engagement behavior (i.e., staying on-task and in-seat behavior). Two of these nominated students returned parental consent.

Once parent consent was obtained the special education teacher was interviewed to obtain background information on the students, determine a target task or activity for each participant, and assess their baseline levels of on-task and in-seat behavior. To determine the target activity for each participant, the teacher was interviewed to ascertain the time during each school day that the students had the most difficulty remaining on-task and in their seat for a specific recurring activity (e.g. daily math lesson). The target daily activity was morning group for both participants.

Morning group is an instructional activity that occurred daily at 10:00 in the morning. During this 30 to 45 minute time period, a smart board is used to review aspects of the calendar such as the day of the week, date, and month of the year. Other activities conducted during this time include listening to stories and songs, identifying stimuli on the smart board, and discussing relevant holidays. Students during morning group sat in

standard chairs in a semi-circle within 5-7 feet of the smart board. Sarah and John's off-task behavior consisted of directing gaze towards irrelevant areas of the room or other students. When Sarah left her seat, she typically walked a short distance away and was easily redirected by the teacher or teaching assistant. The classroom teacher or teaching assistant conducted the morning group activities.

### *Study Variables*

*Independent variable.* The independent variable in this study was the use of alternative seating with a therapy ball during a target activity. Each participant used a therapy ball of 65" in size with a stabilizing aspect to ensure their safety. Sarah used an inflatable ring that surrounded the therapy ball. John used a disc which the therapy ball sat in to ensure that the ball remained in place. The size of the therapy balls allowed each participant to sit in such a way as to maintain feet flat on the floor. The teacher was instructed to maintain her typical schedule and classroom management techniques during both baseline and intervention phases of the study. The only change was the use of the therapy ball instead of a standard chair.

*Dependent variables.* Two variables were measured: 1) in-seat behavior and 2) on-task behavior. In-seat behavior is defined as any portion of the participants' buttocks in contact with the therapy ball, with the therapy ball in contact with the floor. The participant's feet must have also been touching the floor. On-task behavior is defined as the participant's orientation toward the classroom activity, instructional materials, or instructor. For the target activity, this may have been a student performing an aspect of

the activity, the smart board, materials often passed from student to student, the classroom teacher, or teaching assistant.

Both dependent variables were monitored using systematic direct observation (SDO) of 15 seconds. Two observation data collection sessions were used on Mondays, Wednesdays, and Fridays. The recorder was prompted to observe every 15 seconds and record state behaviors of whether the student was on-task or not and whether the participant was seated or not. A frequency count of out of seat behavior was also noted throughout observation.

*Interobserver Reliability.* Double coded observations occurred over two data collection days resulting in four observations per participant. A second observer was prompted to record data as described previously. Percentage of agreement was used to determine the reliability to the data collection observation methods used. Percentage of agreement is calculated by dividing the total number of observation intervals by the number of agreeing observation intervals and multiplying by one hundred.

*Social validity.* The teacher completed a survey about her perception of the alternative seating. This survey was completed in order to determine the social validity of the intervention. The survey was completed at the end of the study and included questions that probed the teacher's perception of the alternative seating vs. the typical classroom seating.

*Treatment integrity.* To maintain the integrity of the intervention, mandated use of the therapy ball occurred only on days when data was collected. Intervention use and data collection observations occurred on Mondays, Wednesdays, and Fridays. On Tuesdays



and Thursdays, use of the intervention was optional, though the teacher chose not to use the intervention on such days.

### *Design & Analysis*

An ABAB single-case design was used. Prior to data collection, the therapy balls were placed in the classroom with the option of use as seating to allow participants to adjust to its presence and novelty. One of the therapy balls and stabilizing tools were already used in the classroom. The other therapy ball and stabilizing ring were provided and remained in the classroom upon completion of the study. During the initial baseline phase ( $A_1$ ), classroom activities and teacher behaviors remained unaltered. Participants were seated as they typically were during the target activity. Data were collected on each participant's in-seat and engagement/on-task behavior until baseline data was stable. Baseline was considered stable when at least three consecutive data points remain the same. Baseline phases ( $A_1$ ) for each participant included data points from four observation sessions.

During the first intervention phase ( $B_1$ ) data was collected over two data collection observations. A total of six observation sessions were used for this phase. During this phase, teachers were instructed to use the therapy balls during the same target activity on the days when data was collected. While the therapy ball was the only available seating for the student, the teacher was instructed to prompt the participants to sit in a similar fashion as she would with typical seating. No other changes to curriculum or schedules were made.

During the second baseline phase ( $A_2$ ) therapy balls were not used and the typical seating was provided in its place.  $A_2$  included six observations sessions. No other changes to curriculum or schedules were made. Data was collected in a similar fashion to the intervention phase.

During the second intervention phase ( $B_2$ ) the therapy ball was once again mandatory during the morning group and typical seating during the target activity was removed. The teacher was instructed to prompt students to sit on the therapy balls as they would with typical seating. Data was collected twice per day over three days resulting in six observation sessions. No other changes to curriculum or schedules were made.

Visual analysis of mean level changes across phases was used to detect changes in the dependent variables from baseline to intervention. Variability within and across phases, proportion of overlapping data across phases, immediacy/latency of effects, magnitude of changes in the DV, and consistency of intervention findings across participants was also considered.

## CHAPTER IV: RESULTS

Figures 1 and 2 display four phases of data for the participants' in-seat/on-ball and on-task/academic engagement behaviors. For both participants, in-seat behavior remained high during initial baseline, particularly for John who remained in-seat throughout all observations. The primary focus of the observations, therefore, was increasing on-task/academic engagement behavior.

Interobserver reliability was calculated using percentage of agreement. Determining the total amount of intervals of agreement throughout all observations for both participants and dividing that number by the total number of observed intervals calculates percentage of agreement. Eighteen percent of the observation sessions were double coded. Double coding occurred on two observation days resulting in four observations per participant. The resulting agreement between observers was 85 percent of intervals.

### *Participant 1*

Sarah's data are shown in Figure 1. Sarah's initial baseline data ( $A_1$ ) show a mean of 39 percent time on-task. This phase shows stable data with a slight increasing trendline of 0.6 units per observation. In the  $B_1$  phase, in which the therapy ball was introduced as seating, Sarah's data display an immediate level change, beginning this phase with 72 percent on-task behavior observed. Though this phase displays a decreasing trend, the percent of non-overlapping data points in phase  $B_1$  compared to phase  $A_1$  is 100 percent. The initial intervention phase ( $B_1$ ) had a mean percent of time on-task of 65.7 percent. Sarah's in-seat behavior fluctuated slightly through phase  $A_1$  and  $B_1$ . The mean

difference, however, was just 0.2 percent. In-seat behavior still appeared to be an insignificant concern as percent of time in-seat ranged from 87-100 percent.

Sarah's data for phase. A<sub>2</sub>, during which the therapy ball was removed and typical seating returned in its place, shows a return to baseline data with a mean percent of time on-task of 40 percent. This verifies that the initial baseline data (A<sub>1</sub>) provides an adequate prediction of Sarah's typical on-task behavior. Like phase B<sub>1</sub>, phase A<sub>2</sub> shows a decreasing trend of 4.23 units per observation. A<sub>2</sub> shows a deceleration of on-task behavior as evidenced in the decreasing trendline as compared to that of A<sub>1</sub> baseline. Phase B<sub>2</sub>, during which the therapy ball once again replaced typical seating in order to replicate the first intervention phase's findings, shows a mean percent of time on-task of 39 percent, that of both baseline phases. B<sub>2</sub> achieved 16.7 percent non-overlapping data points compared to A<sub>2</sub>.

#### *Experimental Control*

Sarah's data were obtained using an ABAB single case design of systematically observed intervals of in-seat/on-ball and on-task/academic engagement behavior. Sarah's on-task behavior was low with typical seating during morning group. Sarah's baseline on-task behavior confirms this prediction with a mean percent of time on-task of just 39 percent. The first intervention phase, B<sub>1</sub>, should have shown a higher level and mean percent of time on-task if Sarah responded as predicted to the sensory integration intervention. Sarah did display an immediate level change and higher mean percent of time on-task during this phase of 65.7 percent. This phase also provided 100 percent of non-overlapping data points, further supporting the notion that Sarah's on-task behavior

in this phase was different from that of her predicted on-task behavior. During this phase, however, a decreasing trend is observed. A decreasing trend in the presence of the intervention indicates that positive effects of the intervention waned. This trend continued into the verification phase,  $A_2$ , during which time the intervention was removed in order to observe a return to baseline levels of on-task behavior. During this phase Sarah's mean on-task behavior returned to that of the initial prediction phase with a mean of 40 percent. 100 percent of non-overlapping data points would have supported the notion that without the intervention in place, Sarah's on-task behavior would decrease. This phase's data points, however, overlapped significantly indicating a significant latency of effects. Finally, phase  $B_2$ , during which time the intervention was returned in order to replicate the first intervention phase's results, should have shown an immediate effect of the intervention similar to phase  $B_1$ . During this phase, however, data show a high degree of variability and significant overlap of data points. This phase did not replicate the higher mean percentage of time on-task, but instead had a mean identical to that of the prediction baseline phase.

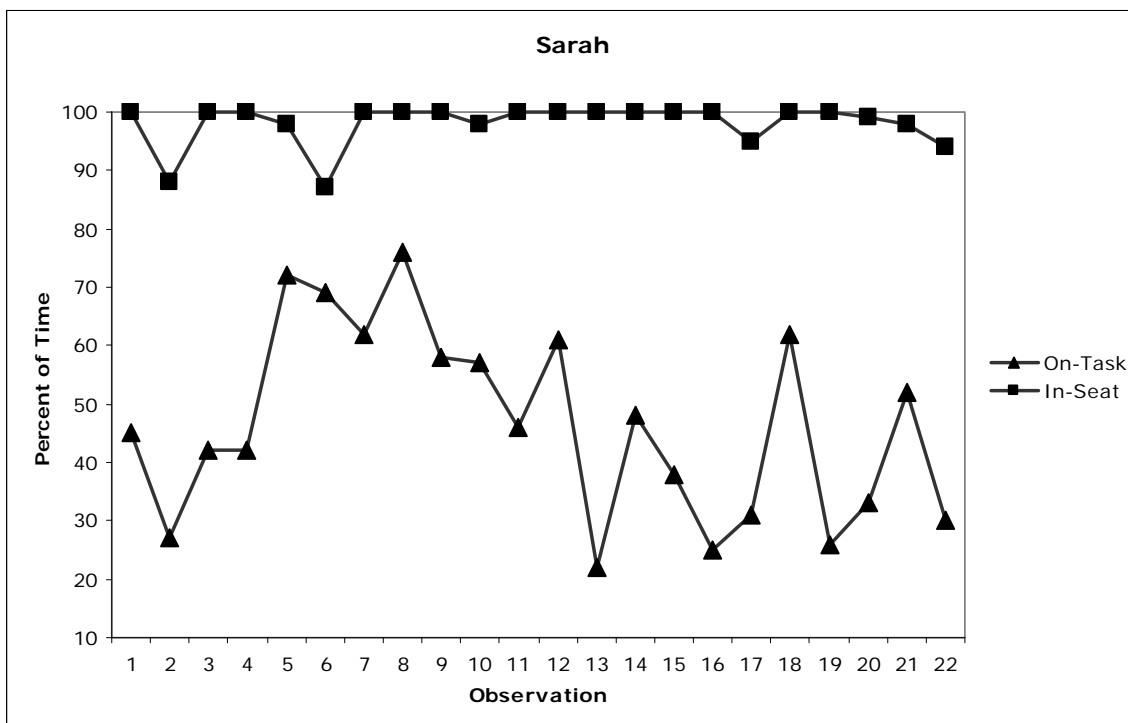


Figure 1. Sarah's mean percent of time on-task and in-seat/on-ball

### *Participant 2*

John's data are shown in Figure 2. In phase A<sub>1</sub> baseline data show a mean percent of time on-task of 53.8 percent. Data in phase B<sub>1</sub> during which time the therapy ball was initially introduced as seating, show an immediate improvement in on-task behavior with an initial percent of time on-task of 80 percent. In this phase, the mean percent of time on-task improved from the baseline phase to 69.8 percent with a range of on-task behavior from 56 to 80 percent. Phase B<sub>1</sub> compared to phase A<sub>1</sub> produced 66.7 percent of non-overlapping data points. This first intervention phase, however, produced a decreasing trendline.

John's data for phases A<sub>2</sub> and B<sub>2</sub> are displayed in Figure 2. In phase A<sub>2</sub>, when the intervention was removed and typical seating returned in order to replicate the initial

baseline conditions, data returned below that of A<sub>1</sub>'s baseline with a mean percent of time on-task of 24.2 percent. In this phase there was an increasing trendline of 3.29 units per observation and 100 percent non-overlapping data points, indicating an immediate reaction to the withdrawal of the intervention and then an increase in on-task behavior despite the absence of the intervention. The percent of non-overlapping data points of 100 percent indicates a possible accelerating extinction effect in this phase. Phase B<sub>2</sub> data present a mean percent of time on-task of 41.7 percent, lower than that of original baseline data and short of the mean percent of time on-task achieved in the first intervention phase. A decreasing trendline and high variability is also noted in this phase with a range of 28-71 percent of time on-task.

#### *Experimental Control*

John's data were obtained using an ABAB single case design of systematically observed intervals of in-seat/on-ball and on-task/academic engagement behavior. John's level of typical on-task behavior was low with a mean of 53.8 percent. The first intervention phase was intended to demonstrate an immediate effect of the intervention as evidenced by a higher mean percent of time on-task. This was accomplished by an initial mean percent of time on-task of 80 percent. The overall mean in this phase was higher than that of baseline with 69.8 percent. This phase, however, displays a decreasing trend, which may indicate a waning effect of the intervention. Phase A<sub>2</sub>, a verification of the prediction baseline phase, should have shown a return to baseline as this phase removes the intervention. This phase displays a lower mean percent of time on-task even to that of initial baseline with a mean of just 24.2 percent. Like the previous phase, A<sub>2</sub> also shows a

trend contrary to that expected if the intervention had the intended effect. This phase displays an increasing trend, which may indicate that John had an immediate reaction to the absence of the intervention that was not sustained. This phase, however, achieved 100 percent non-overlapping data points, indicating significantly different data than that of the intervention phase. The final phase in which the intervention effects are intended to be replicated by returning the therapy ball as seating, displays a mean percent of time on-task of 41.7 percent. To demonstrate effectiveness of the intervention, John's on-task behavior in this phase should have returned to similar levels as the first intervention phase though his on-task behavior actually resulted in a percentage lower than that of initial baseline. This phase also displays a decreasing trend, similar to that of the first intervention phase and contrary to the expectations of this study.

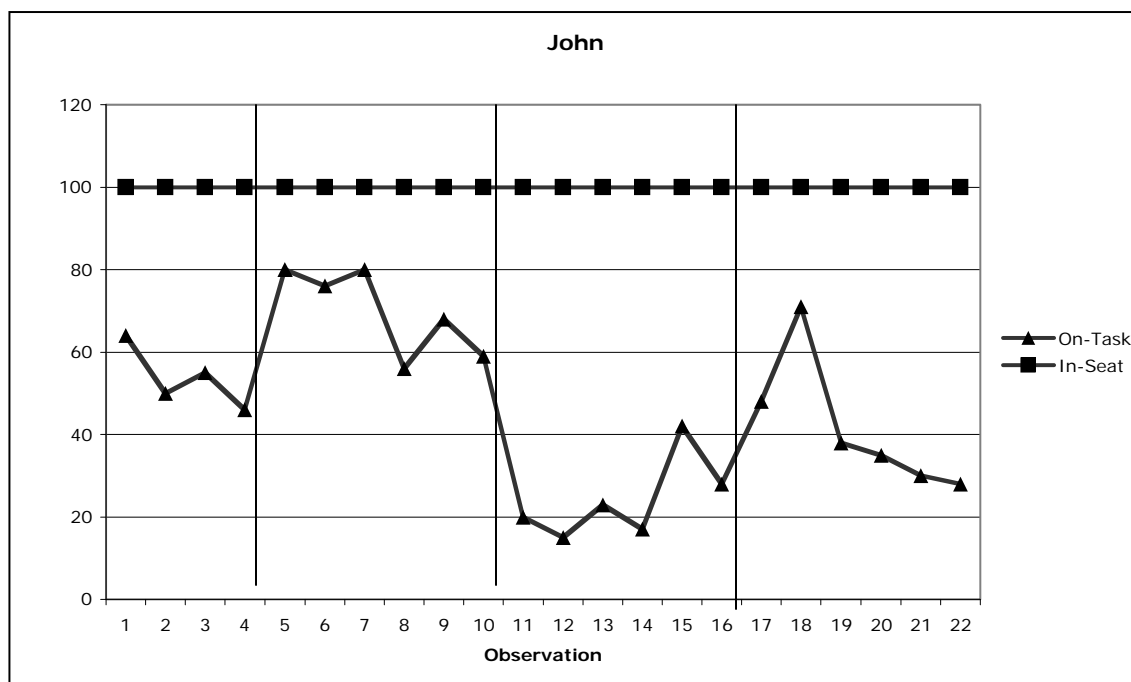


Figure 2. John's mean percent of time on-task and in-seat/on-ball



*Social Validity*

The classroom teacher of the two participants was provided a questionnaire related to her perception of the therapy ball intervention after data collection was completed. The teacher had utilized therapy balls as seating prior to the implementation of this intervention, but not within the past month. She also employed other sensory integration techniques in her classroom such as a swing and sensory room. The teacher's perception of the logistical validity of therapy balls proved to be positive as she agreed that therapy balls may be easily stored and that the intervention requires little effort on her part to implement. The teacher reported that therapy balls are not disruptive or distracting to other students. In regards to the acceptability of the intervention, the participants' teacher reported that she would suggest this intervention to other teachers in her field and planned to use this intervention in the future. The teacher provided no other feedback, concerns, or suggestions.

## CHAPTER V: DISCUSSION

The purpose of this study was to examine the effectiveness of therapy balls as an intervention for students with autism. Three research questions were proposed including whether or not therapy balls as alternative seating are effective in improving in-seat behavior, effective in improving on-task behavior, and whether or not the teacher perceived the intervention to be useful and feasible. Single case design was utilized to observe the in-seat and on-task behavior of two high school students with autism.

Data related to the in-seat and on-task behavior of Sarah and John indicate an immediate and positive reaction to the therapy ball intervention that was not maintained. Sarah's data showed an immediate reaction to the intervention with decreasing on-task behavior through each subsequent phase. Sarah, therefore, seemed to react as expected to the intervention but this reaction was short lived and decreased whether she used a typical chair or a therapy ball. John's on-task behavior also improved immediately upon the introduction of the therapy ball. When typical seating was returned, he reacted immediately with lower levels of on-task behavior. Unfortunately, the effects of the intervention were not replicated, indicating that the therapy ball is not a long-term solution to his off-task behavior. Neither John nor Sarah displayed significantly low in-seat behavior. In-seat behavior in both participants remained high despite the intervention's presence or absence.

The findings of this study are dissimilar to that of Schilling and Schwartz (2004) who utilized this intervention with four preschool students with autism. Their study displayed substantial improvements in both in-seat and on-task behavior in all four

participants across intervention phases. Several possible explanations exist for differences in findings between Schilling and Schwartz and the present study.

### *Theory 1*

Schilling and Schwartz present data from four students with autism of different ages than those used for the present study. This difference in age may provide an explanation for these differences. Schilling and Schwartz note in their research a strikingly different use of the therapy ball by most of their participants than by either John or Sarah. John was never observed to rock, roll, or bounce on the therapy ball. Sarah occasionally rocked slightly back and forth on the ball. Schilling and Schwartz note more active use of the therapy balls, such as vigorous bouncing by one participant. This may be due to differing levels of energy and need for exertion of preschool versus high school children. Older students may display less physical use of the ball as a result of their age and reduced need for physical exertion. Whether this indicates lesser sensory integration deficits among older students is difficult to determine. John and Sarah's in-seat behavior may indicate a lack of seeking out of sensory stimuli or methods of sensory expression. Therefore, sensory integration may not have been an existing deficit in these participants. Older students' sensory integration deficits that result in off-task behavior may also manifest differently from younger students who may be more preoccupied by self-stimulatory behaviors.

Age and its contribution to different findings may be explained by a natural progression in the development of sensory integration. Sensory integration may naturally improve with age and explain the lack of long-term effects of the present study's

intervention. In preschool aged children with autism, sensory integration may be poorly developed and result in a need for an intervention to address the lack of sensory regulation. In older students, this skill may develop at a delayed rate but ultimately allow for students to regulate their sensory environment with enough efficiency to be productive.

Compliance may also contribute to these findings. Younger students with less time in structured environments may struggle more with compliance to classroom demands than older students. As a result, younger students may actually find a therapy ball enjoyable during less desirable tasks. Compliance, therefore, may be high in older students who instead display their off-task behavior less obviously. As a result, older students' off-task behavior may not present as disruptive compared to younger students. Off-task behavior, whether disruptive in the classroom or not, may still result in poor school outcomes. Worse still may be the implications of off-task behavior that are not addressed due to a lack of obvious disruption to the classroom.

### *Theory 2*

Dissimilar findings may have resulted from the inherent differences in intervention characteristics. Though other elements of the study were replicated, subtle elements such as teacher and student interaction, setting, and participant characteristics were naturally different and contributed to the success or failure of the intervention. Though single case design allows for some control in studies that do not utilize randomization or control groups, elements such as those described cannot be controlled and will naturally differ from one intervention setting to another. It is not simply the use

of the therapy ball that affects student behavior. Teacher behavior and characteristics contribute to the intervention despite efforts to instruct their behavior. These elements cannot necessarily be controlled and may explain why an intervention may be successful in one setting and not another.

While neither the present study nor Schilling and Schwartz's 2004 study directly measure sensory integration, it is at the center of the therapy ball intervention's rationale. If sensory integration contributes to the therapy ball intervention, the success of Schilling and Schwartz's study may be due to the presence of sensory integration deficits. The present study may have showed less positive results simply because sensory integration deficits did not exist in our participants.

Schilling and Schwartz (2004)'s study supports the notion that therapy balls allow students with autism opportunities for appropriate sensory modulation. The present study's findings, however, do not provide as compelling of data. Current data may indicate that, though on-task behavior was a significant concern, therapy balls as alternative seating may not be an intervention to address off-task behavior in older students over the long-term. Whether this is because sensory integration is not the source of concern, sensory integration improves with development, or that the intervention is simply reinforcing to some students and not others is difficult to determine. No definitive statements may be made about the efficacy of therapy balls as alternative seating without more studies similar to these.

The teacher's perception of the intervention, however, was positive. This teacher had previously utilized this intervention in her classroom and supported the acceptability

and feasibility of the intervention in classrooms similar to that in which the intervention was conducted. Not only this, the teacher reported her intention to continue utilizing this intervention in her classroom in the future.

#### *Limitations and Implications for Future Research*

Though the present study's findings do not support therapy balls as a long-term solution for on-task/academic engagement behavior, these findings are limited to that of just two students. Other high school students and other high school settings may provide more positive results than those used for this study. Future research is charged with the task of exploring more participants' reaction to this intervention. Future research should also address the lack of data for elementary school students with autism that exists.

#### *Conclusion*

This study replicated a similar study by that of researchers Schilling and Schwartz (2004) with high school students with autism. Data indicates that though the therapy ball intervention presented initial positive results, neither student's on-task behavior was significantly improved through its use. This study serves to note possible differences in high school and preschool students with autism. Regardless of the data's implication on the efficacy of the therapy ball intervention, such research provides further information on the development of autism spectrum disorder throughout the life span.

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## APPENDIX A

### PARENT CONSENT FORM

#### **The Effects of Alternative Seating on the Academic Engagement of Children with Autism**

Your child is invited to participate in a research study conducted by Dr. Walcott, an ECU Professor, and Hillary Tunstall, a Graduate Student in School Psychology. Your child is specifically being invited because he or she has a special education IEP related to services for Autism. This study will look at the effects of using an alternative seating method on classroom performance.

#### WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this research study is to determine if the use of a therapy ball for seating increases students' on-task and in-seat behaviors as compared to when they sit in regular school chairs.

#### WHY WERE YOU SELECTED?

You are being invited to participate in this research study because your child receives services for Autism and may benefit from the intervention currently being examined.

#### WHAT WILL BE DONE IN THIS STUDY?

If you consent for your child to participate, we will first ask his/her teacher to select a time when the child typically works on academic tasks while seated at a table or desk. Next, a graduate student in School Psychology will observe your child's in-seat behavior and on-task academic engagement during these selected times. Once we have a good picture of how your child typically behaves during these academic times, we will introduce the alternative seating (therapy ball) during these same times for a week. Each time your child uses the alternative seating, the graduate student will again observe your child's in-seat behavior and on-task academic engagement. These measures will help us to see if your child better attends to academic tasks when on the therapy ball than when seated in a regular seat.

#### **Description of Alternative Seating Intervention:**

Therapy balls are large inflatable balls that may currently be used in your child's classroom as a sensory integration tool. These balls can be bounced or rolled when used as seating. By using these balls (with disks that stabilize & prevent rolling) as an alternative to typical seating such as chairs, they may benefit the child by allowing them to adjust the input of sensory information they receive from the environment, thus allowing them to better focus on academic tasks.

#### **Description of Observation Measures:**

**In-seat behavior:** The percentage of the time your child remains in their seat or on the therapy ball will be measured by systematically observing them every 15 seconds during an academic activity.

**On-task academic engagement:** The percentage of the time your child remains on-task will be measured by systematically observing them every 15 seconds during an academic activity. On-task means attending to materials or individuals relevant to the academic activity.

ARE THERE ANY BENEFITS FOR PARTICIPATING IN THIS STUDY?

Participating in this seating intervention may help your child better attend to classroom instruction and academic tasks. Collecting this data will help us to better understand whether this particular seating method helps children with autism to attend better than when they are using traditional seating. Also, after collecting the data, we can share the results with your child's teacher, and if the seating improves performance, the therapy balls will be available for student use after the study is done.

WHAT ARE THE POSSIBLE RISKS OR DISCOMFORTS OF THE STUDY?

We do not anticipate any serious risks for children who participate. One possible minor risk is that the child may have trouble balancing or otherwise sitting on the therapy ball. However, the balls to be used in the study have stabilizing disks on them to prevent rolling, and they have been used effectively with younger children with autism and other disabilities in previous studies.

WHO HAS ACCESS TO RECORDS?

The only people that will have access to the behavioral outcome data are the researchers in the study and your child's teacher. Once the data are collected, your child's name will be coded (Child A, Child B, etc), so that anonymity will be assured. If we present any results from this intervention study in a journal or at a conference, no children's names will be used.

WHAT IF I WISH TO WITHDRAW OR NOT PARTICIPATE IN THE STUDY?

Participation in this study is voluntary, and you can refuse to participate or withdraw your child from the study at any time without penalty.

WHAT IF I HAVE QUESTIONS ABOUT THIS STUDY OR MY RIGHTS AS A PARTICIPANT?

If you have any particular questions about this study, please contact the investigator, Christy M. Walcott, Ph.D. by phone: (252) 328-1378, e-mail: [walcottc@ecu.edu](mailto:walcottc@ecu.edu), or regular mail: 104 Rawl Bldg., ECU-Department of Psychology, Greenville, NC 27858.

If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact – anonymously if you wish – the ECU University and Medical Center Institutional Review Board at (252) 744-2914, e-mail: [umcirb@ecu.edu](mailto:umcirb@ecu.edu), or regular mail: University and Medical Center Institutional Review Board, Life Sciences Building, Room 104, The Brody School of Medicine at East Carolina University, Greenville, NC 27834.

AUTHORIZATION

By signing below, you are agreeing to let your child \_\_\_\_\_ participate in the project called "**The Effects of Alternative Seating on the Academic Engagement of Children with Autism**" as described above.

Parent's Signature \_\_\_\_\_ Date \_\_\_\_\_

Parent's Name (please print) \_\_\_\_\_

Thank you and please return this part of the form to your child's teacher using the enclosed envelope addressed to Hillary Tunstall / Christy Walcott.

## APPENDIX B

**TEACHER CONSENT FORM****The Effects of Alternative Seating on the Academic Engagement of Children with Autism**

You are invited to participate in a research study conducted by Dr. Walcott, an ECU Professor, and Hillary Tunstall, a Graduate Student in School Psychology. You are specifically being invited because you are a teacher in a self-contained classroom for students with Autism. This study will look at the effects of using an alternative seating method on classroom performance.

**WHAT IS THE PURPOSE OF THIS STUDY?**

The purpose of this research study is to determine if the use of a therapy ball for seating increases students' on-task and in-seat behaviors as compared to when they sit in regular school chairs.

**WHAT WILL BE DONE IN THIS STUDY?**

If you consent to participate, we will first ask you to send home parent consent forms with a description of the study to the parents of your students whom you believe have difficulties with staying on-task and/or in-seat during academic tasks.

For those whose parents agree to participate, we will then ask you to select a time when the child typically works on academic tasks while seated at a table or desk. Next, a graduate student in School Psychology will observe these children's in-seat behavior and on-task academic engagement during these selected times. Once we have a good picture of how the children typically behaves during these academic times, we will ask you to introduce the alternative seating (therapy ball) during these same times for a week. Each time the child uses the alternative seating, the graduate student will again observe the child's in-seat behavior and on-task academic engagement. These measures will help us to see if the child better attends to academic tasks when on the therapy ball than when seated in a regular seat.

**Description of Alternative Seating Intervention:**

Therapy balls are large inflatable balls that may currently be used in your child's classroom as a sensory integration tool. These balls can be bounced or rolled when used as seating. By using these balls (with disks that stabilize & prevent rolling) as an alternative to typical seating such as chairs, they may benefit the child by allowing them to adjust the input of sensory information they receive from the environment, thus allowing them to better focus on academic tasks.

**Description of Observation Measures:**

In-seat behavior: The percentage of the time your child remains in their seat or on the therapy ball will be measured by systematically observing them every 15 seconds during an academic activity.

On-task academic engagement: The percentage of the time your child remains on-task will be measured by systematically observing them every 15 seconds during an academic activity. On-task means attending to materials or individuals relevant to the academic activity.

**ARE THERE ANY BENEFITS FOR PARTICIPATING IN THIS STUDY?**

Collecting this data will help us to better understand whether this particular seating method helps children with autism to attend better than when they are using traditional seating. Participating in this seating intervention may help your students better attend to classroom instruction and academic

tasks. Also, after collecting the data, we can share the results with you, and if the seating improves performance, the therapy balls will be available for your classroom use after the study is over.

#### WHAT ARE THE POSSIBLE RISKS OR DISCOMFORTS OF THE STUDY?

We do not anticipate any serious risks for children who participate. We also do not anticipate any risks or discomforts due to your participation. It may take some extra time to speak with parents about the study, if they ask you questions, and you may need to remind students or parents to return the consent form. You are always free to refer parents to us for questions about the study. When the intervention is in place, we do not ask that you do anything different or alter your instructional methods in any way. The only change will be the method of seating – therapy ball vs. regular chair.

#### WHO HAS ACCESS TO RECORDS?

The only people that will have access to the behavioral outcome data are the researchers in the study and you. Once the data are collected, your child's name will be coded (Child A, Child B, etc), so that anonymity will be assured. If we present any results from this intervention study in a journal or at a conference, no children's names will be used.

#### WHAT IF I WISH TO WITHDRAW OR NOT PARTICIPATE IN THE STUDY?

Participation in this study is voluntary, and you can refuse to participate or withdraw from the study at any time without penalty.

#### WHAT IF I HAVE QUESTIONS ABOUT THIS STUDY OR MY RIGHTS AS A PARTICIPANT?

If you have any particular questions about this study, please contact the investigator, Christy M. Walcott, Ph.D. by phone: (252) 328-1378, e-mail: [walcottc@ecu.edu](mailto:walcottc@ecu.edu), or regular mail: 104 Rawl Bldg., ECU-Department of Psychology, Greenville, NC 27858.

If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact – anonymously if you wish – the ECU University and Medical Center Institutional Review Board at (252) 744-2914, e-mail: [umcirb@ecu.edu](mailto:umcirb@ecu.edu), or regular mail: University and Medical Center Institutional Review Board, Life Sciences Building, Room 104, The Brody School of Medicine at East Carolina University, Greenville, NC 27834.

#### AUTHORIZATION

By signing below, you \_\_\_\_\_ agree to participate in the project called **“The Effects of Alternative Seating on the Academic Engagement of Children with Autism”** as described above.

Teacher's Signature \_\_\_\_\_ Date \_\_\_\_\_

Teacher's Name (please print) \_\_\_\_\_

Thank you and please return this part of the form to Hillary Tunstall or Christy Walcott using the enclosed envelope.

## APPENDIX C

**Intervention Questionnaire****Background Info:**

1. How long have you been teaching students with autism? \_\_\_\_\_
2. What (if any) of sensory integration therapeutic techniques do you currently utilize in your classroom?
3. Have you used therapy balls as seating in the past? YES / NO

If so, did it prove helpful in educating your student(s)?

**Please respond to the following statements using the rating scale described below:**

*Logistics*

Therapy balls are easily stored in my classroom.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
Some students were distracted by the presence of the therapy balls.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
Other students were troubled/jealous when another student was using the therapy ball as seating.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
I have space in my classroom for a therapy ball when not being used by a student.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
Therapy balls were more disruptive in my classroom then they were helpful.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
All students should have access to a therapy ball to reduce frustration.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
<i>How much effort</i> did this intervention require of you?	No Effort	Very Little Effort	Moderate Effort	Great Deal of Effort	-----	-----

*Acceptability*

This is an acceptable intervention for the school difficulties of students with autism.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
I would suggest the use of this intervention to other teachers.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
The students liked using the therapy balls.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
Most teachers would find this intervention suitable for a child with autism.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
My students did not resist the use of the therapy ball.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
This intervention is reasonable for students with autism.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
I would use this intervention in my classroom.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
My students seemed to pay better attention to tasks when using the therapy ball.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
I plan to continue use of this intervention upon completion of the study.	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree

**Is there anything that would make this intervention more likely to be used in your classroom in the future?**

**Other comments regarding this intervention:**

*THANK YOU!!!*

## APPENDIX D

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UMCIRB

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University and Medical Center Institutional Review Board  
 East Carolina University  
 Ed Warton Life Sciences Building • 600 Moye Boulevard • LSB 104 • Greenville, NC 27834  
 Office 252-744-2914 • Fax 252-744-2284 • www.ecu.edu/irb  
 Chair and Director of Biomedical IRB: L. Wilcy Nifong, MD  
 Chair and Director of Behavioral and Social Science IRB: Susan L. McCammon, PhD

TO: Hillary Tunstall, Dept of Psychology, ECU—104 Rawl Building  
 FROM: UMCIRB 2/17/09  
 DATE: February 16, 2009  
 RE: Expedited Category Research Study  
 TITLE: "The Effects of Alternative Seating on the Academic Engagement of Children with Autism"

UMCIRB #09-0099

This research study has undergone review and approval using expedited review on 2.6.09. This research study is eligible for review under an expedited category because it is a research on individual or group characteristics or behavior (including, but not limited to: research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

The Chairperson (or designee) deemed this **unfunded study no more than minimal risk** requiring a continuing review in **12 months**. Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The investigator must adhere to all reporting requirements for this study.

The above referenced research study has been given approval for the period of 2.6.09 to 2.5.10. The approval includes the following items:

- Internal Processing Form: (dated 12.15.08)
- Informed Consent: Parent & Teacher
- Invention Questionnaire

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

**The UMCIRB applies 45 CFR 46, Subparts A-D, to all research reviewed by the UMCIRB regardless of the funding source. 21 CFR 50 and 21 CFR 56 are applied to all research studies under the Food and Drug Administration regulation. The UMCIRB follows applicable International Conference on Harmonisation Good Clinical Practice guidelines.**

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418  
 IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418  
 IRB00004973 East Carolina U IRB #4 (Behavioral/SS Summer) IORG0000418  
 Version 3-5-07

UMCIRB #09-0099  
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