

Abstract

IMPLEMENTING THE ALERT PROGRAM® IN A KINDERGARTEN CURRICULUM  
USING THE RESPONSE TO INTERVENTION (RtI) METHOD

by

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Young children with sensory processing issues in the classroom can experience a feeling of disconnect in receiving sensory stimuli with which the child, parent and teacher may not understand nor be able to cope. Such an issue could hinder early educational success. A joint research study between East Carolina University's Department of Occupational Therapy and The Oakwood School determined if children's sensory processing abilities could be enhanced to better attend and thereby improve academic and social functioning in the kindergarten classroom. Researchers implemented the Alert Program® for Self-Regulation by following tier one and tier two of the Response to Intervention model (RtI) in two kindergarten classrooms. The Alert Program® was developed by two occupational therapists and is based on A. Jean Ayres sensory integration approach. The study was implemented for six months using weekly small group (60 minutes) activities and daily center time activities (approximately 10 minutes). The study answered the following research questions: 1) will kindergarteners demonstrate improved function in the academic and social function in a kindergarten classroom than the control group kindergarteners who did not receive the RtI model with the Alert Program® for

Self-Regulation as assessed by the School Function Assessment (SFA); and, 2) will kindergarten students improve more in their ability to regulate their arousal state when shown how to use age appropriate Alert Program® for Self-Regulation activities and strategies than the control group as assessed by the Sensory Profile- Short Form and the Sensory Processing Measure (SPM) - Home and Classroom Forms.

A two group non-randomized controlled trial using a pre-test post-test design was used between kindergarten classes from two different schools. Scores were compared between the experimental and control groups using the three afore mentioned assessments. Statistical analysis demonstrated significant changes within the SFA-Part III Activity Performance Cognitive /Behavioral Tasks. The experimental group significantly improved in five of the nine areas and the control group had only one significant change that reflected a significant negative change in the post-test mean score. For the SPM-Classroom Form scores, both the experimental and the control group made significant improvements in over half of the eight areas assessed. The SPM-Home Form indicated significant findings in three of the eight areas for the control group and one of the eight areas for the experimental group. The Sensory Profile - Short Form was used only by the experimental group, and indicated significant changes in two of its eight areas. This study supports the fact that the Alert Program® can be used successfully within a kindergarten classroom to change classroom behaviors and increase appropriate arousal states. This study lays the foundation for further research in ways to regulate young students' levels of arousal for learning and basic functioning in the academic and social aspects of a classroom.

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USING THE RESPONSE TO INTERVENTION (RtI) METHOD

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Master's of Science in Occupational Therapy

by

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## CHAPTER 1: INTRODUCTION

For many children with sensory processing issues, carrying out everyday activities can be challenging and frustrating. The disconnect in receiving sensory stimuli and processing such stimuli can lead to difficulties for children and their caregivers in regulating emotions, following directions, or activities of daily living such as eating or dressing. These issues can manifest themselves through children seeking out sensory stimuli, becoming too alerted, or too calm by not appropriately responding to sensory stimuli. Children with sensory processing issues need to learn and practice techniques that allow them to recognize their different levels of arousal. These children also need to learn how to use activities and strategies to control their behavior, learn new skills, interact with others and the environment, express their feelings, and attend to learning. The Alert Program® is such a program that teaches both children and adults to recognize their state of alertness and how to use alerting or calming strategies to regulate their emotions and body movements (Therapy Works, Inc., 2010).

Such concepts can be directly applied by occupational therapists working with young children. Even if children do not have diagnosed sensory needs, the concepts in the Alert Program® can be utilized with school-aged children to optimize classroom participation and outcomes when working with young children. As play is the main occupation for children, occupational therapists can apply these concepts of the Alert Program® within play interventions that are meaningful to the child to achieve optimum performance.

### *Purpose of the Study*

The purpose of this joint research study between East Carolina University's Department of Occupation Therapy and The Oakwood School was to see if activities and strategies from the Alert Program® enhanced kindergarten sensory processing abilities to attend in the classroom

for learning. The study also addressed if young children could begin to identify specific Alert Program® activities and strategies that would help their level of alertness to be successful in the classroom. Specifically, the hypotheses were as follows:

- Following six months of using the Alert Program® for Self-Regulation in weekly small group activities and daily center time activities in first tier and second tier of the Response to Intervention (RtI) model, students will improve their ability to regulate their arousal state for learning. The improvement will be reflected in better academic and social function in a kindergarten classroom, measured using the School Function Assessment, compared to the control group not receiving Alert Programming in the RtI model.
- Following six months of using the first and second stages of the Alert Program® for Self-Regulation in weekly small group activities and daily center time activities, kindergarten students will improve more in their ability to regulate their arousal state when shown how to use age appropriate Alert Program activities and strategies than kindergarten students who did not receive the Alert Program® for Self-Regulation as assessed by the Sensory Profile – Short Form and the Sensory Processing Measure (Home and Classroom).

## CHAPTER 2: LITERATURE REVIEW

### *Sensory Integration*

Sensory integration is the innate ability of humans to receive a physical stimulus, by sight, touch, taste, smell, sound, or movement, translate that stimulus into a neural transmission, and then appropriately perceive that sensation. In young children who have difficulty with regulating this sensory information, something goes awry in the time between translating the stimulus into an impulse and perceiving that sensation. Such difficulty can negatively affect development and functional abilities in behavioral, emotional, cognitive, and motor domains (Ahn, Miller, Milberger, & McIntosh, 2004).

Concepts in neuroscience provide a background for understanding how the sensory receptors receive information and transmit sensory stimuli, how the central nervous system interprets this sensory information, and how that information is used to create and control motor output (Dunn, 1997). Modulation, the nervous system's ability to supervise and adjust information with the goal of generating an appropriate motor and sensory response, is an important piece of sensory processing. According to authors Lane, Lynn, and Reynolds (2010), "the term modulation can be applied to any act that produces change or adjustment with the intent to match a biological, social, or contextual condition" (p. CE-1).

The key processes related to modulation are habituation and sensitization. Habituation refers to the central nervous system's ability to recognize repeated sensory stimuli and adjust the body's response so that there is not a need to continually respond to said stimuli (Dunn, 1997). Habituation allows a child to become accustomed to repeated sensory stimuli, such as the feeling of clothing tags, so that they may attend to playing and learning. Sensitization refers to the body's ability to recognize a certain stimuli as important or potentially harmful and adjust the

body's response to a more alert state (Dunn, 1997). Sensitization allows a child to become aware of certain stimuli, such as the heat from a stove, and move their hand away from the harmful burner. In order for the central nervous system, and therefore the child, to process modulation functionally, it must be able to regulate the patterns between habituation and sensitization. If a child does not have the ability to modulate, there exists an imbalance between the two – a child may be overly excitable, hyperactive, and hypersensitive (too much sensitization) or lethargic, inattentive, and perhaps hyposensitive (too much habituation) (Dunn, 1997). It is important to note that it is normal for the patterns of habituation and sensitization to change throughout the day in response to different situations, allowing for differing levels of arousal (Dunn, 1997). These concepts lay the foundation for meeting the sensory needs of children with processing difficulties through occupational therapy and for establishing the model which shapes the Alert Program®.

Sensory integration therapy has been used in a variety of settings for treating children and adults with such disorders as autism, intellectual disabilities, and other profound handicaps (Smith, Press, Koenig, & Kinnealey, 2005). Sensory integration therapy involves the following characteristics: active participation of the client, client-directed activity, individualized treatment, purposeful activities that require an adaptive response, and organization and treatment provided by a trained therapist (Smith et al., 2005). Such therapy uses planned and controlled sensory input to stimulate and organize vestibular, proprioceptive, and tactile sensory systems to elicit an adaptive response that meets the child's neurological needs (Ayres, 1972). The purpose is to create a calm state of arousal that optimizes learning and decreases inappropriate sensory behaviors.

Using the sensory integration approach to therapy, a case study (Schaaf & Nightlinger, 2007) was used to examine the effectiveness of such therapy on a boy with sensory processing disorder, specifically sensory modulation disorder in overresponsivity. Overresponsivity refers to a child who cannot properly modulate the process of sensitization, therefore becoming overresponsive to sensory stimuli. The child was previously diagnosed with sensory modulation disorder and referred to occupational therapy to address specific needs such as expressive language, motor development, and social/emotional development (Schaaf & Nightlinger, 2007). Following ten months of direct, child-centered sensory integrative therapy, the child demonstrated notable improvements in areas such as motor planning, vestibular gross motor play, social development, and fine motor play (Schaaf & Nightlinger, 2007). The child also exhibited decreased tactile and vestibular overresponsivity as evidence by his tolerance of oral-motor stimulation, increased food tolerance, and enjoyed a variety of sensorimotor activities both at therapy and at home (Schaaf & Nightlinger, 2007). This study demonstrates the effectiveness of using a sensory integrative approach in working with young children, specifically in occupational therapy.

Additionally, the effects of sensory integration intervention were studied on self-stimulating and self-injurious behaviors in children and adolescents with pervasive developmental delay and mental retardation (Smith, Press, Koenig, & Kinnealey, 2005). Using an experimental group of seven children ages 8 to 19, the researchers compared the frequency of self-stimulating behaviors following either sensory integration therapy or tabletop activity intervention. Smith et al. (2005) found that self-stimulating behaviors were significantly reduced by 11% one hour following sensory integration therapy as compared to simple tabletop activity intervention. Activities that were primarily tactile, vestibular, and proprioceptive appeared to be

most beneficial in reducing self-stimulatory behavior when compared to the control group (Smith et al., 2005). Although there was no change immediately following either intervention, delayed results were observed by both the teachers and the researchers. It was hypothesized and proven that the reduction of these behaviors created a calm alert stage which allowed for an optimal learning environment (Smith et al., 2005). The findings of this study suggest that there is a need for more long-term research to examine the results of sensory integration therapy.

Sensory integration dysfunction has also been researched for its effects on the play habits of young children. One such study specifically addressed the effect sensory processing disorder has on playfulness and the effect of sensory integrative intervention on playfulness (Bundy, Shia, Qui, & Miller, 2007). The researchers examined 20 children who had been identified as having sensory processing disorder and 20 children who were identified as typically developing. These groups were compared against one another in both sensory levels as measured using the Short Sensory Profile (SSP) and in level of playfulness using the Test of Playfulness (ToP) (Bundy et al., 2007). The researchers found that while the children who were typically developing scored significantly higher on the ToP than the children with sensory processing disorder; the mean score of the group with SPD was equivalent to the sample scores provided by the standardized ToP (Bundy et al., 2007). This suggests that both groups were relatively playful. Additionally, the researchers found that there was no significant difference in level of playfulness as measured by the ToP following SI intervention (Bundy et al., 2007). The researchers acknowledge the limitations of their study, being that the variable play was used and play is difficult to control and that small numbers were used. Further implications for research suggest the need to study both the play of children with SPD, specifically sensory modulation disorder, and the effectiveness of intervention on play skills.

Miller, Coll, and Schoen (2007) examined the effectiveness of occupational therapy using a sensory integration approach with children with sensory modulation disorders as compared to other treatment approaches. Using a sample size of 24 children, participants were randomly sorted into three particular groups – a sensory integration group, a table top activities group, and a control group that received no treatment (Miller et al., 2007). For ten weeks, the children in the sensory integration group met twice a week to participate in child-led, sensory-based, manualized session to focus on attaining occupational therapy goals (Miller et al., 2007). In this particular group, the parents of the involved children were active participants in therapy and guided the priorities of the goals (Miller et al., 2007). The second group engaged in table top activities such as arts and crafts, puzzles, and blocks and the activities were designed and implemented by non-occupational therapy staff members and graduate students who had experience with young children (Miller et al., 2007). For this second treatment group, parents were not involved with the therapy nor educated regarding intervention (Miller et al., 2007). The last treatment group was a passive control group – children on the waiting list for sensory integrative occupational therapy (Miller et al., 2007). Several assessments were used to measure the level of progress following the treatment – the Leiter International Performance Scale-Revised: Parent Rating Scale, the Short Sensory Profile, the Vineland Adaptive Behavior Scale, the Child Behavior Checklist, and goal attainment scaling. Following the treatment, the children in the sensory integration group made significant changes as compared to the table top activities group and the control group on the goal attainment scaling and on Attention and Cognitive/Social composite on the Leiter: Parent Rating Scale (Miller et al., 2007). In addition, trends towards significance were also found on the Internalizing portion of the Child Behavior Checklist and on the total score of the Short Sensory Profile (Miller et al., 2007). The findings

of this study, although small in sample size, suggest that children who receive sensory integration-based occupational therapy may have greater success in minimizing difficulties associated with sensory modulation disorders.

### *The Alert Program®*

For this research study, the Alert Program® was used to examine the effectiveness of A. Jean Ayres' sensory integrative therapy on occupational therapy and kindergarten curriculum outcomes. A brief overview of the Alert Program® is necessary in order to outline specific strategies. The Alert Program® was developed by occupational therapists Sherry Shellenberger and Mary Sue Williams as a school-based program to help modulate the behaviors of children and adolescents (Therapy Works, 2010). Using the idea of an engine, the program suggests children to imagine their body is like a car engine – is it running too high, too low, or just right? Along with identifying how their body is behaving, children are taught strategies to either change or maintain their level of alertness. As addressed previously, maintaining a level of calm alertness is most beneficial to optimum learning abilities.

A basic understanding of the levels of the Alert Program® is needed to understand the process of this study. Stage One of the Alert Program® focuses on introducing the basic concepts of the program and includes the following steps:

- a. Reinforce student/teacher understanding of engine words.
- b. Reinforce teacher/adult understanding of their own engine levels.
- c. Children develop beginning awareness of the feel of their own engine speeds, using the adult's labels as guides.
- d. Children learn to identify and label alertness levels for themselves with adult assistance.

- e. Teachers/adults label their own engine levels.
- f. Children begin to label engine levels for themselves outside the classroom with adult assistance.

Stage Two of the program focuses on experimenting with methods to change engine speeds and includes the following steps:

- a. Children continue to learn and review Stage 1 concepts.
- b. Researchers introduce sensorimotor methods/Alert Program® strategies to change engine levels.
- c. Researchers identify children's sensorimotor methods/Alert Program® strategies preferences and sensory hypersensitivities.
- d. Children begin experimentation with choosing sensorimotor methods/Alert Program® strategies to change their engine levels (with adult assistance as needed).

Finally, Stage Three of the program focuses on the child regulating their own engine speeds and includes the following steps:

- a. Children choose strategies independently.
- b. Children use those strategies independently outside of treatment sessions.
- c. Children learn how to change engine levels when options are limited.
- d. Children continue receiving occasional support.

According to Williams and Shellenberger (1996), a student need not progress through the entire Alert Program® to benefit. Typically, only children who are eight years or older can regulate their arousal state without adult supervision (Williams and Shellenberger, 1996). Given

that the students in this research study were six years old and younger, only Stages One and Two were implemented.

The Alert Program® has primarily been used in schools to examine the program's effectiveness. It has been used collaboratively with classroom-based curriculum in a middle school special education class and with kindergarten, first, and second grade students to help teach social skills (Barnes, Vogel, Beck, Schoenfeld, & Owen, 2008). Children in both studies showed progress in self-awareness, problem solving, self-regulation strategies, and social skills. A small study examined the effectiveness of the Alert Program® in three elementary aged boys with a special education classification of emotional disturbance with low-normal intelligence ranges (Barnes, Schoenfeld, Garza, Johnson, & Tobias, 2005). Three assessments, the Piers-Harris Children's Self-Concept Scale, the Devereux Behavior Rating Scale – School Form, and the Sensory Profile, were used before and after implementing the Alert Program® in the classroom for one semester (Barnes et al., 2005). A fourth tool used was a behavior checklist, used in the classroom three days a week for one hour periods to monitor the students' frequency of classroom behaviors (Barnes et al., 2005). Following the implementation of the Alert Program® three days a week, the three students showed some improvement, although the authors caution that they cannot determine if this was the direct effect of the program or from other interventions based in the classroom (Barnes et al., 2005). One of the three students had significant improvement on the Devereux Behavior Rating Scale – School Form, one of the three students had significant improvement on the Piers-Harris Children's Self-Concept Scale, and a different student had a significant improvement on the Sensory Profile, reducing their areas of "definite or probable differences: from six to two (out of a possible nine areas) (Barnes et al., 2005). The authors of this study concluded that while the effect of the Alert Program® was

difficult to determine, they learned that the Sensory Profile was a useful tool in determining outcomes following the intervention (Barnes et al., 2005). The authors also agreed the Alert Program® would best be implemented in a whole classroom setting with teacher collaboration (Barnes et al., 2005). These results were not statistically analyzed though their clinical significance was noted. Although the researchers acknowledged the small changes, the results showed that the Alert Program® can be a beneficial tool to help children recognize their own feelings and abilities, and then make the appropriate changes necessary to regulate behavior. Such a study lends itself to further research regarding the effectiveness of the Alert Program® on specific outcomes.

The aim of one particular study was to integrate an occupational therapy-based program into a typical kindergarten classroom. Previous research has shown that this method can be effective in improving kindergartener's fine motor and emergent literacy skills in a classroom that serves both children with and without disabilities (Bazyk, Michaud, Goodman, Papp, Hawkins, Welch, 2009). This particular study examined the effectiveness of integrating occupational therapy services with all children regardless of ability into a kindergarten classroom by linking fine motor and literacy concepts to the classroom curriculum (Bazyk et al., 2009). Following seven months of embedded occupational therapy, the study found that children without disabilities made significant improvements in both fine motor skills (as measured by the Fine Motor Quotient of the Peabody Developmental Motor Scales-2 and subtests of the Visual Motor Integration Test) and in emergent literacy skills (as measured by subtests of the Observation Survey of Early Literacy Achievement and subtests of the Approximation to Texts) as indicated by increased scores in all eight measures (Bazyk et al., 2009). The children with disabilities made significant improvements in two of the fine motor assessments and three of the

emergent literacy tests (Bazyk, 2009). The class as a whole made statistically significant changes in all eight of the measures (Bazyk, 2009). Although there was no control group, and the authors of this study acknowledged that limitation, this study points out the ability to integrate occupational therapy-based concepts and practices into a classroom with success. Such integration can be made possible by the implementation of such practices as the Response to Intervention (RtI) model.

### *Response to Intervention*

According to the National Association of State Directors of Special Education (NASDSE), Response to Intervention (RtI) is “the practice of providing high-quality instruction/intervention matched to student needs and using learning rate over time and level of performance to make important education decisions” (American Occupational Therapy Association [AOTA], 2008). An educational model, RtI uses a multi-tiered approach to identify students with needs while at the same time, providing assistance to all students to achieve higher levels of learning. The three-tiered model begins at Tier 1, with universal intervention applied to the entire student population, and is called the core instruction (AOTA, 2008). Using the entire class, teachers and therapists will provide screening and education to determine whether or not students are learning at the appropriate level. After a period of time, Tier 2 is implemented, in which targeted intervention for identified students will be initiated to assist those children in reaching the expected level of performance (AOTA, 2008). Tier 3 is intended for those children, who after this targeted, small-group intervention, still require one-on-one intervention past the level of remediation (AOTA, 2008).

The RtI model fits in well with the *Occupational Therapy Practice Framework* and is well-suited to be integrated into classroom. In the domain of context in Tier 1 of RtI,

occupational therapists can provide sensory materials to be used for all students requiring a sensory break or modify classroom rules to allow for the students to practice self-regulating and modulation strategies (Cahill, 2007). For Tier 2, performance skills and performance patterns are taken into consideration as occupational therapist may create small groups to focus on certain skills, such as sensory over-responsivity (Cahill, 2007). Overall, the purpose of implementing the RtI approach is to allow for recognition of at-risk students within the classroom and avoid students “slipping through the cracks” by not being identified properly. Targeting the whole classroom and providing both screening and intervention allows for support to both the teachers and the students.

A suburban school district in central Texas carried out a pilot study examining the effectiveness of implementing the RtI model in elementary schools (Reeder, Arnold, Jeffries, McEwen, 2011). Occupational therapists, physical therapists, speech language pathologists, and school psychologists, along with teachers and administrators, were all involved in the four-step process: a) administering a screening tool; b) educating teachers and staff about the process; c) providing resources and strategies for identified at-risk students; and d) referring those identified students to special education and related services (Reeder et al., 2010). Using the screening tool, *FirstSTEP*, the areas of language, cognition, fine motor, and gross motor (each administered by their respective therapist) were screened with 60 pre-kindergarten students (Reeder et al., 2010). Out of those 60 students, eight were identified as “unable to cooperate,” and four were identified as “at-risk” for developmental delay (Reeder et al., 2010). Three of those four at-risk students were able to pass the screening tool at a follow-up in three months time, and those identified as “unable to cooperate” completed and passed the *FirstSTEP* six weeks later (Reeder et al., 2010). At the follow-up visit, the remaining student was able to pass the motor sections, but not the

language or cognition sections despite specific interventions recommended by the speech language pathologist (Reeder et al., 2010). Subsequently, the student was referred to special education services for formal evaluation (Reeder et al., 2010). Besides the outcome of identifying a child with special education needs, this study reported that implementing the RtI model into their elementary schools allowed teachers and staff to better recognize the role of occupational therapy, physical therapy, and speech language therapy in education as well as foster a working relationship between the staff and special education services (Reeder et al., 2010).

Additionally, the RtI model was used successfully to identify a general education student whose fine motor difficulties were impacting her academic performance. A first grader was identified using Tier 1 of the RtI model as having fine motor concerns by a screening tool and clinical observations. The student's concerns were difficulty copying words, difficulty maintaining appropriate spacing between words, difficulty cutting with scissors, and becoming physically overwhelmed with the task of writing (Clark, Brouwer, Schmidt, Alexander, 2008). After having been identified with these needs, the student was placed in a small group three to four times a week focusing on handwriting skills, Tier 2 (Clark et al., 2008). The handwriting group focused not only on specific strategies to use when in the classroom and at home to facilitate ease with handwriting, but specific fine motor tasks intended to increase strength and dexterity (Clark et al., 2008). After eight weeks of targeted intervention, the student's progress was evaluated and found to have improved significantly, therefore, Tier 3 of RtI was not needed (Clark et al., 2008).

For this specific research study, only Tiers 1 and 2 were used in implementing the Alert Program®. Integrating the Alert Program® using the RtI model consisted of whole-class

activities and instruction which determined what children were having specific sensory needs, in tactile/proprioception, motor/vestibular, oral, motor, or a combination of such. These whole-class activities and instruction were what the study's Tier 1 of the RtI model was based on. Tier 2 consisted of small groups with similar needs that focus on general and specific sensory issues. The researchers did beginning teaching on how all children with and without identified sensory difficulties could appropriately cope with their sensory issues and move toward attending better in the classroom and at home.

## CHAPTER 3: METHODOLOGY

### *Design*

The study used a pre-test/post-test design that is well suited for the educational setting using an experimental and control group. The experimental group was comprised of twenty-seven children from two kindergarten classes from a private, independent school. Students in the experimental group received developmentally appropriate activities that were based on Williams' and Shellenberger's (1996) "How Does Your Engine Run" Alert Program®. The investigators included the principal investigator, one thesis student, and two master's project students. The experimental group received large group instruction by the investigators once a week for 40-60 minutes. Daily follow-up sensorimotor activities were added six to eight weeks later in the program once the teachers and students were more familiar with the Alert Program®. The investigators selected three to four follow-up activities the children had enjoyed during their large group instruction. The teacher assistant was asked to make these activities available during free play center; it was important that the students could carry out each activity independently. The study's control group consisted of 20 kindergarten children from a rural public school. The control group followed a typical kindergarten curriculum and did not receive additional Alert Program-based activities.

### *Participants*

The participants included 47 students between the ages of four to six years, 27 attended kindergarten at the Oakwood School in Greenville, NC, (experimental) and the remaining 20 students attended Williamston Primary School in Williamston, NC (control). The inclusion criteria for both the experimental and control groups were that the participants must be enrolled in one of the three kindergarten classrooms, were between the ages of four to six years, and the

parent/caregiver must have signed a consent form to participate in the study. The control group came from a variety of socioeconomic backgrounds, ethnicities, and family situations. The experimental group attended an independent school which required a yearly tuition consistent with a different economic profile than the control group. The participants were chosen as a convenience sampling, using a school where there is administrative support to participate in the research, teachers willing to participate in research, and a location within commuting distance from East Carolina University.

The experimental group had 13 boys and 14 girls with a mean age of 67.24 months (5 years, 7 months) at pre-test and a mean age of 72.28 (6 years, 0 months) at post-test. The control group had 8 boys and 12 girls with a mean age of 65.35 (5 years, 5 months) at pre-test and a mean age of 70.35 (5 years, 10 months). This is an age difference of two months between the control group and experimental group, with the experimental group being slightly older.

The attendance in the experimental group for the Alert Program® was gathered while attendance for the control group was not. Out of the 19 weekly sessions, 15 out of the 27 experimental students had perfect attendance, with four students missing only one day, four students missing two days, and four students missing three or more days. Missed sessions were all attributable to school absences.

### *Instrumentation*

Three assessments were used in this research study: 1) the School Function Assessment: Part III Activity Performance – Cognitive/Behavioral Tasks (see Appendix C); 2) the Sensory Processing Measure – Main Classroom Form and Home Form (see Appendices D and E); and 3) the Sensory Profile – Short Form (see Appendix F). A second research study in conjunction with

this study examined the relationship in outcomes between the Sensory Profile – Short Form and the Sensory Processing Measure.

### *School Function Assessment*

The School Function Assessment (SFA) measures a student's performance of functional tasks that support his or her participation in the academic and social aspects of an elementary school program. The SFA is a criterion-referenced instrument most commonly used by classroom teachers to rate a child's performance in three areas: 1) participation; 2) task supports; and 3) activity (Coster, Deeney, Haltiwanger, & Haley, 2008). For the purposes of this study, classroom teachers rated performance in cognitive/behavioral tasks which fell under activity performance. The SFA categorizes cognitive/behavioral tasks into functional communication, memory and understanding, following social conventions, compliance with adult directives and school rules, task behavior/completion, positive interaction, behavior regulation, personal care awareness, and safety (Coster et al., 2008). For the SFA, students were rated on a 4-point scale (1= does not perform, 2= partial performance, 3= inconsistent, and 4= consistent performance).

The SFA was selected for this study for its ability to measure a student's performance on functional tasks especially in activity performance areas and has established internal consistency reliability coefficients range from 0.92 to 0.98 for each of the 27 rating scales (Coster et al, 2008). The internal consistency estimates were completed on a sample of 363 special education students (Coster et al., 2008). The test-retest reliability coefficients ranged from 0.80 to 0.99 (Coster et al., 2008). The user manual is well-organized, clearly written, and provides sufficient information. The SFA recording form is well-constructed and contains adequate instructions for the respondent who is completing the form.

### *Sensory Processing Measure*

The Sensory Processing Measure (SPM) consists of three forms: 1) The Home Form; 2) the Main Classroom Form; and, 3) the Social Environments Form. These three forms together measure a child's sensory processing, praxis, and social participation (Western Psychological Services, 2007). The SPM assesses the visual, auditory, tactile, proprioceptive, and vestibular sensory systems, provides information of processing vulnerabilities within each system, and compares these measures across the child's home, school, and community environments (Western Psychological Services, 2007). For this specific research project, only the Home and Main Classroom Form were used to assess sensory needs. All other settings/contexts were beyond the scope of the project, therefore the Social Environment Form was not used. The Home Form was filled out by child's parent/caregivers and the Main Classroom Form was filled out by the child's primary classroom teacher.

Both of the Home Form and the Main Classroom Form generate eight norm-referenced standard scores: Social Participation, Vision, Hearing, Touch, Body Awareness, Balance and Motion, Planning and Ideas, and Total Sensory Systems (Western Psychological Services, 2007). The items are scored on a 4-point Likert Scale, from never to always; the higher the raw score, the greater the dysfunction. The standard score for each section allows the examiner to classify the child's functioning into three ranges – Typical, Some Problems, or Definite Dysfunction. The standard scores on the Home Form and the Main Classroom Form are then compared to discover whether or not there are differences in the child's functioning based on environment.

The Home Form and the Main Classroom Form have been standardized on a demographically representative sample of 1,051 typically developing children in grades kindergarten through sixth (Western Psychological Services, 2007). Published values for

internal consistency range from 0.77 to 0.95 on the Home Form and from 0.75 to 0.95 on the Main Classroom form (Western Psychological Services, 2007). The test-retest reliability for both the Home Form and the Main Classroom Form were about 0.97 (Western Psychological Services, 2007).

### *Sensory Profile-Short Form*

The Sensory Profile-Short Form (SPSF) (Harcourt Assessments, Inc., 2005) was used to understand the sensory needs of the participants. The SP-SF is a 125-item questionnaire completed by the primary caregiver. The SP-SF reports the child's frequency in engaging in behaviors in response to various sensory experiences. Items are grouped by sensory processing, sensory modulation, and behavioral and emotional responses. In addition, there are nine factor groupings that characterize the child's reactions to sensory input including, sensory seeking, emotional reactive, low endurance/tone, oral sensory sensitivity, inattention/distractibility, poor registration, sensory sensitivity, sedentary, and fine motor/perceptual. The Sensory Profile has established reliability profiles using Cronbach's coefficient alpha for internal consistency in each section, with alpha values ranging from 0.47 to 0.91 for the various sections (Harcourt Assessments, Inc., 2005). Content validity was established for the SPSF by a panel of expert occupational therapy practitioners who determined that the items were placed in the correct sections and that all areas were assessed. To examine convergent validity, SP-SF was also examined against the School Function Assessment (Harcourt Assessments, Inc., 2005). There were high correlations between the School Function Assessment performance items and the items in the fine motor/perceptual category of the SP-SF as well as between the School Function Assessment socializations and behavior interaction sections and the modulation section of the SP-SF (Harcourt Assessments, Inc., 2005).

### *Step-Wise Summary of Experimental Plan*

1. Obtained parental permission from parents of kindergarten students attending the Oakwood School to participate as the experimental group in this research study.
2. Obtained parental permission from parents of kindergarten students attending Williamston Primary School to participate as the control group in this research study.
3. After parental consent was secured, teachers and parents completed the Sensory Processing Measure (Home and Main Classroom forms) by both groups, and the Sensory Profile – Short Form was filled out by the parents of the experimental group. All sensory assessments were returned to researchers.
4. Once a week, researchers carried out weekly whole group and small group 40 - 60 minute activities with the experimental group to introduce the researchers to the children as well as the Alert Program® for Self-Regulation terminology and what that might mean to the children and the teachers. See Appendix G for a sample schedule.
5. Following the first marking period, teachers completed the School Function Assessment –Part III, Cognitive/Behavioral Tasks on each child and returned forms to researchers.
6. Researchers scored then reviewed experimental group pre-test data findings and identified the children who had probable differences or definite differences in one or more of the following sensorimotor areas (mouth, move, touch, look, listen) based on the Sensory Profile – Short Form and the Sensory Processing Measure (Home and Main Classroom Forms).
7. Weekly large group and small group activities were carried out with the experimental children on Stage 1 concepts of the Alert Program® for Self-Regulation. Also offered to the classes were daily Alert Program® independent learning centers that could be carried

out to reinforce Alert Program® learning during center time (See Appendix H). Students were encouraged, but not required to visit these centers. These As appropriate, all Alert Program activities also helped reinforced kindergarten, educational curriculum themes and concepts.

8. Carried out weekly large group and small group activities with the experimental group. Continue using Stage 1 concepts and added Stage 2 concepts of the Alert Program® for Self-Regulation. Continued to offer independent, daily opportunities to reinforce Alert Program® for Self-Regulation during center time.
  - a. As needed, researchers grouped experimental children who have probably differences or definite differences in one or more sensorimotor areas together for weekly small group activities.
  - b. As needed, researchers assisted experimental children who have probable differences or definite differences in one or more sensorimotor areas specific Alert Program strategies and activities during center time that can be carried out independently.
9. Researchers and classroom teachers identified each child's 1-3 top preferences in Alert Program strategies to change their engine level and 1-3 top large group activities. This information was shared with the children's parents and caregivers at the end of the six month research period.
10. Post-testing data was collected from the experimental group and the control group.
11. At the end of the third marking period, test data on learning and school function abilities concepts using the School Function Assessment (SFA) as completed by the classroom teachers for experimental and control students.

### *Ethical Issues*

This study was classified as having a minimal risk by the Institutional Review Board for Human Subjects. The choosing of the experimental and control groups were convenience sampling and no other considerations were made. This study has minimal ethical risks.

### *Data Analysis*

The scores on the Sensory Profile, the Sensory Processing Measure, and the School Function Assessment were analyzed using a paired t-test for pre- and post-test comparison within groups, with time as the dependent variable. Unpaired t-tests were used for pre-test vs. pre-test and post-test vs. post-test comparisons with treatment as the dependent variable. Threshold for significance was set at  $p < 0.05$ .

## CHAPTER 4: RESULTS

Nineteen weekly, 40 to 60 minutes long sessions occurred over the six month period. Following six months of activities in the classroom, statistical analysis of pre- and post-test data revealed significant changes in all three assessments used, the School Function Assessment, the Sensory Processing Measure – Home and Classroom Forms, and the Sensory Profile – Short Form. A significant change is indicated by a p-value of less than 0.05 between the pre- and post-test mean scores.

### *School Function Assessment (SFA)*

The results of the School Functional Assessment are summarized in Table 1 (p. 32). In a comparison of pre-test to post-test performance in the control groups and experimental groups, significant improvements in the experimental group were found in the areas of functional communication ( $p = 0.043$ ), task behavior and completion ( $p = 0.009$ ), positive interaction ( $p = 0.006$ ), personal care awareness ( $p = 0.003$ ), and safety ( $p = 0.007$ ). For the control group, the only area that had a significant change was in the area of safety ( $p = 0.007$ ), and that was a decrease rather than an improvement.

### *SFA: Cognitive/Behavioral Tasks – Functional Communication*

Functional communication measures the ability to communicate basic needs, ask for help, understand 3-step directions, and knowledge of first and last names (Coster et al., 2008). The experimental group's pre-test mean score was 91.06 (out of 100) with improvement in post-test mean score to 96.96. In comparison, the control group's pre-test mean score was 82.35 with improvement to 86.03 in post-test mean score (see Figure 1, p. 33). Although the experimental group started out at a higher level than the control group, the improvement was larger than the control group.

*SFA: Cognitive/Behavioral Tasks – Task Behavior and Completion*

Task behavior and completion focuses on the ability to listen and attend for at least five minutes, the ability to remain in a play or work area unsupervised, the ability to work or play alone for at least 15 minutes, the ability to have patience and not have temper tantrums, and the ability to finish projects that last several days (Coster et al., 2008). For this area (see Figure 2, p. 34), the experimental group began with lower pre-test mean score (76.6), as compared to the control group's pre-test mean score (79.55). However, the control group's post-test mean score decreased slightly (78.94) while the experimental group's post-test mean score increased significantly (84.76).

*SFA: Cognitive/Behavioral Tasks – Positive Interaction*

The area of positive interaction concentrates on appropriate interaction with both peers and adults. Skills such as listening while others are speaking, waiting for turns, offering help, ending conversations appropriately, working cooperatively with peers, and sharing are tasks measured by this score (Coster et al., 2008). In this area, (see Figure 3, p. 35), the control group again started with a higher pre-test mean score (82.95) as compared to the experimental group (77.68). Both the experimental and the control group demonstrated improvement in post-test mean scores (86.72 and 85.47, respectively), but only the experimental group improvement was significant.

*SFA: Cognitive/Behavioral Tasks – Personal Care Awareness*

Personal care awareness deals with activities such as covering the mouth and nose when sneezing, wiping off face or chin as needed, blowing and wiping the nose, washing and drying hands, and other self-care activities to be carried out in a school setting (Coster et al., 2008). The control group had a pre-test mean score of 99.6 but demonstrated a decrease in post-test mean

score, 98.7 (see Figure 4, p. 36). Comparatively, the experimental group began with a significantly lower pre-test mean score (88.04) and, in contrast to the control group, showed a significantly improved post-test mean score (96.48).

*SFA: Cognitive/Behavioral Tasks – Safety*

Lastly, the area of safety focuses on using caution in play activities, identifying emergencies and reporting them to adults, knowledge of strangers, and understanding of potential harm (Coster et al., 2008). In this area (see Figure 5, p. 37), the control group began with a very high pre-test mean score (98.15) compared to the experimental group pre-test mean score (86.52). Both groups showed significant differences between pre-test and post-test scores. However, while the control group had a decrease in post-test mean score (83.31) the experimental group showed an increased in post-test mean score (95.04). The fact that the groups changed in opposite directions and both to a significant level ( $p < 0.05$ ) is remarkable.

*Sensory Processing Measure – Main Classroom Form (SPM-MCF)*

For this particular assessment, in contrast to the SFA above where improvements are indicated by increasing scores, improvements using the SPM-MCF are indicated by a decrease in scores. The results for the SPM-MCF are summarized in Table 2 (p. 38). Following six months of the Alert Program®, the experimental group showed significant improvements in social participation ( $p = 0.004$ ), vision ( $p = 0.002$ ), body awareness ( $p = 0.001$ ), and balance and motion ( $p = 0.008$ ), as well as the overall total score ( $p = 0.010$ ). However, significant improvements also were found in several areas in the control group pre- and post-test mean score comparisons. Similar to the experimental group, significant improvements for the control group were measured in the areas of social participation ( $p = 0.000$ ), vision ( $p = 0.003$ ), body awareness ( $p = 0.011$ ), balance and motion ( $p = 0.029$ ), and in total score ( $p = 0.000$ ). However,

in addition, the control group also demonstrated significant improvements in the additional areas of hearing ( $p = 0.025$ ) and planning and ideas ( $p = 0.002$ ). Overall, the control group had seven areas of improvement compared to the experimental group with five areas of improvement.

#### *SPM-MCF: Social Participation*

This area rates typical behavior in the past month based on skills such as working as a team, resolving peer conflicts without teacher intervention, handling frustration without aggressive behaviors, playing with peers in a variety of activities, entering play without disruption of peers or materials, maintaining appropriate space, maintaining appropriate eye contact, and shifting conversation topics accordingly (Western Psychological Services, 2007). The control group's pre-test mean score was 20.62 with a decrease in the post-test score to 14.22. The experimental group's pre-test mean score decreased from 16.39 to 14.00. In both cases, the differences represented significant improvements (see Figure 6, p. 39).

#### *SPM-MCF: Vision*

This area rates the frequency of behavior associated with the following visual tasks: squinting or covering eyes when in bright light, showing distress at the sight of moving objects, becoming distracted by nearby visual stimuli, spinning or flicking objects in front of eyes, staring intensely, or showing distress when lights are dimmed (Western Psychological Services, 2007). The control group's mean score decreased from 9.61 to 7.89 while the experimental group's mean score decreased from 9.72 to 8.23 (see Figure 7, p. 40). In both cases, the differences represented significant improvements.

#### *SPM-MCF: Hearing*

For this particular area, the responses to hearing loud sounds, showing distress when hearing songs or musical instruments, difficulty determining location of sounds, difficulty

responding to voices or new sounds, making noise during quiet time, speaking too loudly, making excessive noises during transitions, or making unusual noises to self are evaluated (Western Psychological Services, 2007). The control group demonstrated a significant improvement (see Figure 8, p. 41), with scores decreasing from 8.68 to 7.78, while the experimental group did not (10.92 to 10.58).

*SPM-MCF: Body Awareness*

This area rates the awareness of the body and its location in space by reviewing if the student spills when opening containers, chews or mouths inappropriate classroom objects, runs/hops/bounces instead of walking, stomps or slaps the feet when walking, jumps or stomps on stairs, or opens/closes doors with excessive force (Western Psychological Services, 2007). For this area (see Figure 9, p. 42), both the experimental and the control group had significant improvement in scores. The control group decreased from 9.55 to 8.28. The experimental group decreased from 11.16 to 9.72. This decrease in scores is not only significant at the 0.05 level but also at the 0.01 level, making this decrease remarkable.

*SPM-MCF: Balance and Motion*

This area scores behaviors such as running hand along wall when walking, wrapping legs around chair legs, rocking while seating, fidgeting, falling out of desks frequently, leaning on walls or other people when standing, difficulty sitting upright without support, slumping or leaning on desk, and clumsy behaviors (Western Psychological Services, 2007). Again, both the experimental and the control group demonstrated significant improvements in pre- and post-test mean scores (see Figure 10, p. 43). The control group had a decreased in scores from 11.75 to 10.56 while the experimental group decreased from 13.96 to 12.04.

### *SPM-MCF: Planning and Ideas*

This area examined focusing on consistent performance of daily tasks, ability to solve problems efficiently, dropping items when carrying multiple objects, performing tasks out of sequence, failure to complete multiple step tasks, difficulty in correctly imitating demonstrations, difficulty completing tasks from completed model, demonstrating limited imagination, demonstrating poor organization of materials, and repetitive playing during free time (Western Psychological Services, 2007). For this particular area (see Figure 11, p. 44), the control group demonstrated a significant decrease in scores (19.90 to 13.72), while the experimental group did not (16.23 to 15.27).

### *Sensory Processing Measure – Home Form (SPM-HF)*

In the previous section, the SPM-MCF was completed by the teacher. In this section, results are provided for the complementary home version of the SPM that is completed by the parents (SPM-HF). The results are summarized in Table 3 (p. 45). As with the SPM-MCF, improvements are indicated by decreasing scores. Overall, there were more significant changes noted in the control group than in the experimental group, but in contrast to the classroom results, there was no similarity between the responses from the two groups. Significant decreases in mean scores for the control group were found the areas of touch ( $p = 0.019$ ), balance and motion ( $p = 0.022$ ), and in total score ( $p = 0.003$ ). For the experimental group, significant decreased in the mean score were only noted in the area of planning and ideas ( $p = 0.047$ ).

### *SPM-HF: Touch*

For this particular area, the frequency of behaviors including pulling away from light touch, becoming distressed by the feel of new clothes, becoming distressed by having fingernails or toenails cut, avoiding touching or playing with paint, paste, clay, glue, etc., having an

unusually high tolerance for pain, or difficulty locating items in bag or pocket without looking are rated (Western Psychological Services, 2007). The control demonstrated a significant decrease in scores (14.60 to 13.19) while the experimental group scores increased (12.00 to 12.13) (see Figure 12, p. 46).

#### *SPM-HF: Balance and Motion*

This area identifies the frequency of such behaviors as being overly fearful of movement, having good balance, failing to catch oneself when falling, spinning or twirling more than one's peers, showing poor coordination or being clumsy, or leaning on other people or furniture when sitting or trying to stand up (Western Psychological Services, 2007). Again, the control group showed a significant decrease in scores (14.65 to 13.19) while the experimental group did not (12.32 to 12.13) (see Figure 13, p. 47).

#### *SPM-HF: Planning and Ideas*

This section rated the frequency of the child performing inconsistently in daily tasks, difficulty carrying multiple items at one time, failing to perform tasks in proper sequence, failing to complete tasks with multiple steps, difficulty coming up with novel ideas for games or activities, and engaging in repetitive play schemes (Western Psychological Services, 2007). In this area (see Figure 14, p. 48), the experimental group demonstrated a significant decrease in scores (11.28 to 10.44) while the control group did not (13.35 to 12.88).

#### *Sensory Profile – Short Form (SP-SF)*

The Sensory Profile – Short Form was only used in the experimental group and addressed the secondary experimental question: whether a shorter, simpler assessment instrument could be as effective in identifying an effect produced by the Alert Program® intervention. Thus, the results should be reviewed with caution as they cannot be compared to a control group, and

therefore, may not be indicative of the Alert Program's effectiveness. For this assessment, significant change is denoted by an increase in scores. As seen in Table 4 (p. 49), significant increases were noted in two areas: 1) auditory filtering ( $p = 0.003$ ); and, 2) low energy/weakness ( $p = 0.034$ ). In addition, scores in two other areas approached significance: 1) underresponsive/seeking sensation ( $p = 0.054$ ); and, 2) total score ( $p = 0.056$ ).

*SP-SF: Auditory Filtering*

This area examined the ability to filter out auditory distractions. Behaviors include becoming distracted by a lot of noise, appearing to ignore parents/caregivers, inability to work with background noise, difficulty paying attention, and inability to respond to name when hearing is normal (Dunn, 1999). The scores increased from 25.50 to 27.24, a significant change (see Figure 15, p. 50).

*SP-SF: Low Energy/Weakness*

This area examined the student's muscle tone including grasp, fatigue, ability to lift heavy objects, difficulty supporting self during activity, and endurance (Dunn, 1999). The scores in this area (see Figure 16, p. 51) increased from 28.9 to 29.4.

*SP-SF: Underresponsive/Seeks Sensation*

This area examined the frequency of behaviors including enjoying strange noises, making noise for noise's sake, becoming overly excitable during movement activity, seeking all kinds of movement that interferes with daily routines, touching people or objects, leaving clothes twisted on body, or leaving food or materials on hands/face are (Dunn, 1999). For this area, the scores increased from 30.30 to 31.28, indicating they were approaching significance.

Table 1. Comparison of pre- and post-test mean scores of SFA

SFA Cognitive/Behavioral Tasks	Control Group		Experimental Group	
	Pre-test mean score	Post-test mean score	Pre-test mean score	Post-test mean score
Functional Communication	83.35 ± 16.35	86.05 ± 14.16	91.08 ± 17.87	96.96 ± 8.32
	p = 0.398		p = 0.043*	
Memory and Understanding	82.20 ± 19.77	88.53 ± 12.71	88.00 ± 20.02	90.36 ± 15.23
	p = 0.116		p = 0.789	
Following Social Conventions	87.45 ± 15.15	87.53 ± 15.58	84.36 ± 18.17	88.16 ± 17.09
	p = 0.593		p = 0.378	
Compliance with Adult Directives	83.85 ± 16.33	84.16 ± 15.33	75.32 ± 20.37	83.00 ± 19.12
	p = 0.326		p = 0.066	
Task Behavior/Completion	79.55 ± 19.10	78.95 ± 17.10	76.60 ± 22.53	84.76 ± 19.13
	p = 0.443		p = 0.009*	
Positive Interaction	82.95 ± 14.36	85.47 ± 13.73	77.68 ± 17.08	85.70 ± 15.16
	p = 0.310		p = 0.006*	
Behavior Regulation	86.15 ± 15.96	84.95 ± 18.33	78.88 ± 18.55	82.00 ± 18.96
	p = 0.916		p = 0.197	
Personal Care Awareness	99.60 ± 1.79	98.74 ± 2.99	88.04 ± 12.47	96.48 ± 6.48
	p = 0.317		p = 0.003*	
Safety	98.15 ± 4.89	83.32 ± 19.40	86.52 ± 17.72	95.04 ± 10.93
	p = 0.007*		p = 0.007*	

n = 46

Values shown are mean ± standard deviation for each group.

\*p < 0.05

Figure 1. Comparison of pre- and post-test mean scores on SFA: Cognitive/Behavioral Tasks – Functional Communication.

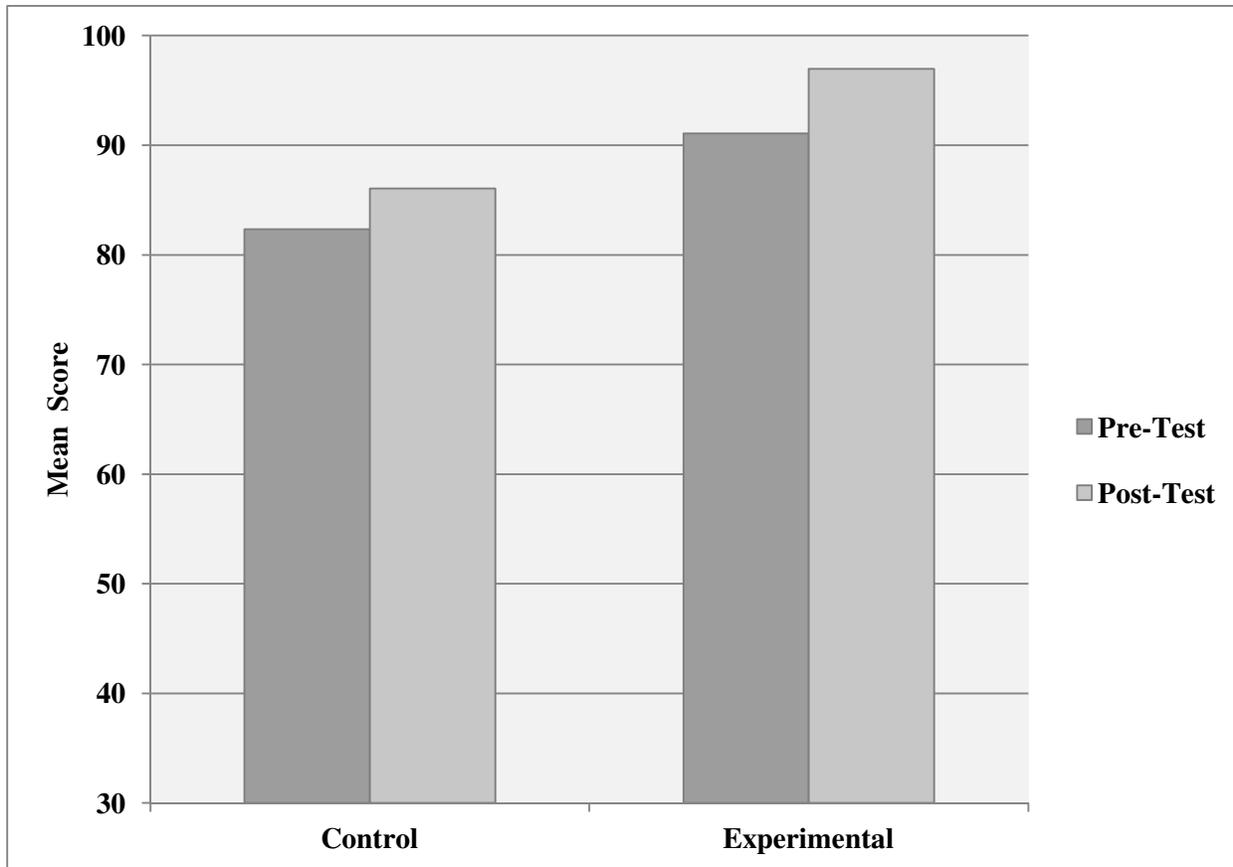


Figure 2. Comparison of pre- and post-test mean scores on SFA: Cognitive/Behavioral Tasks – Task Behavior/Completion.

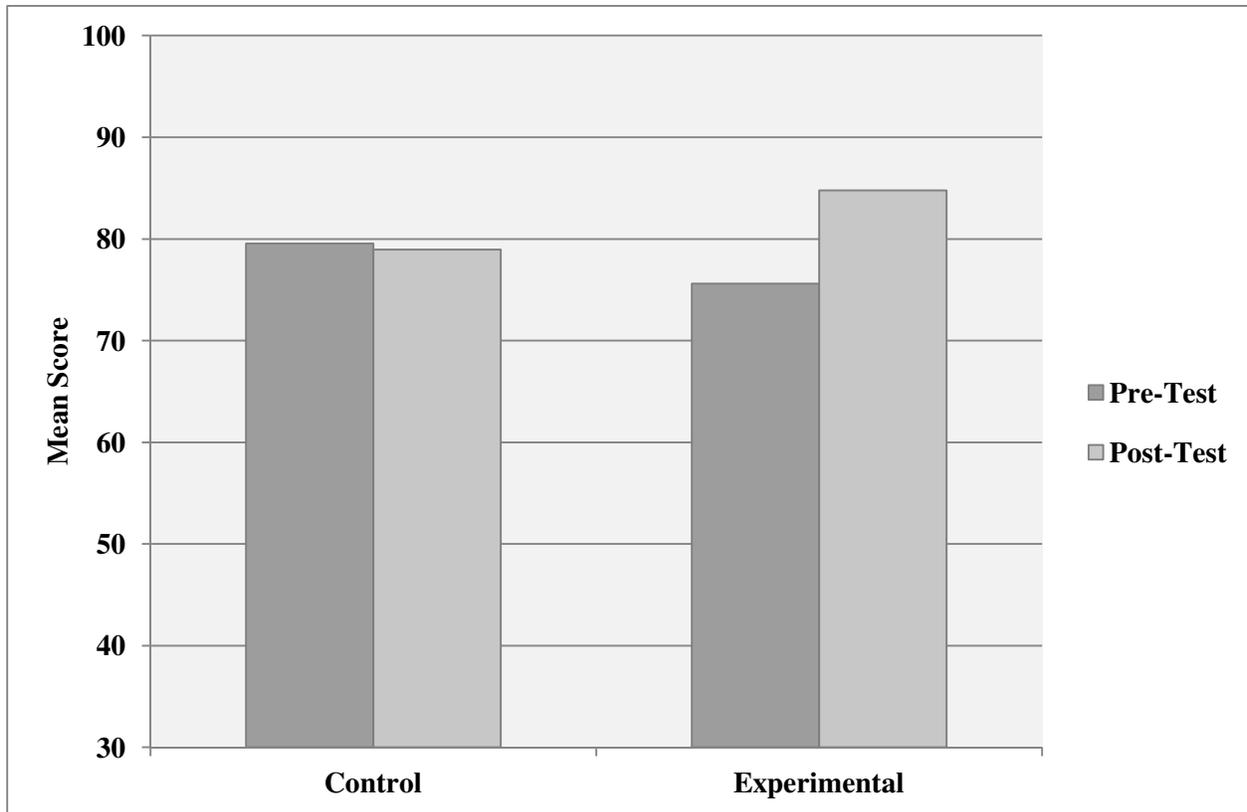


Figure 3. Comparison of pre- and post-test mean scores on SFA: Cognitive/Behavioral Tasks – Positive Interaction.

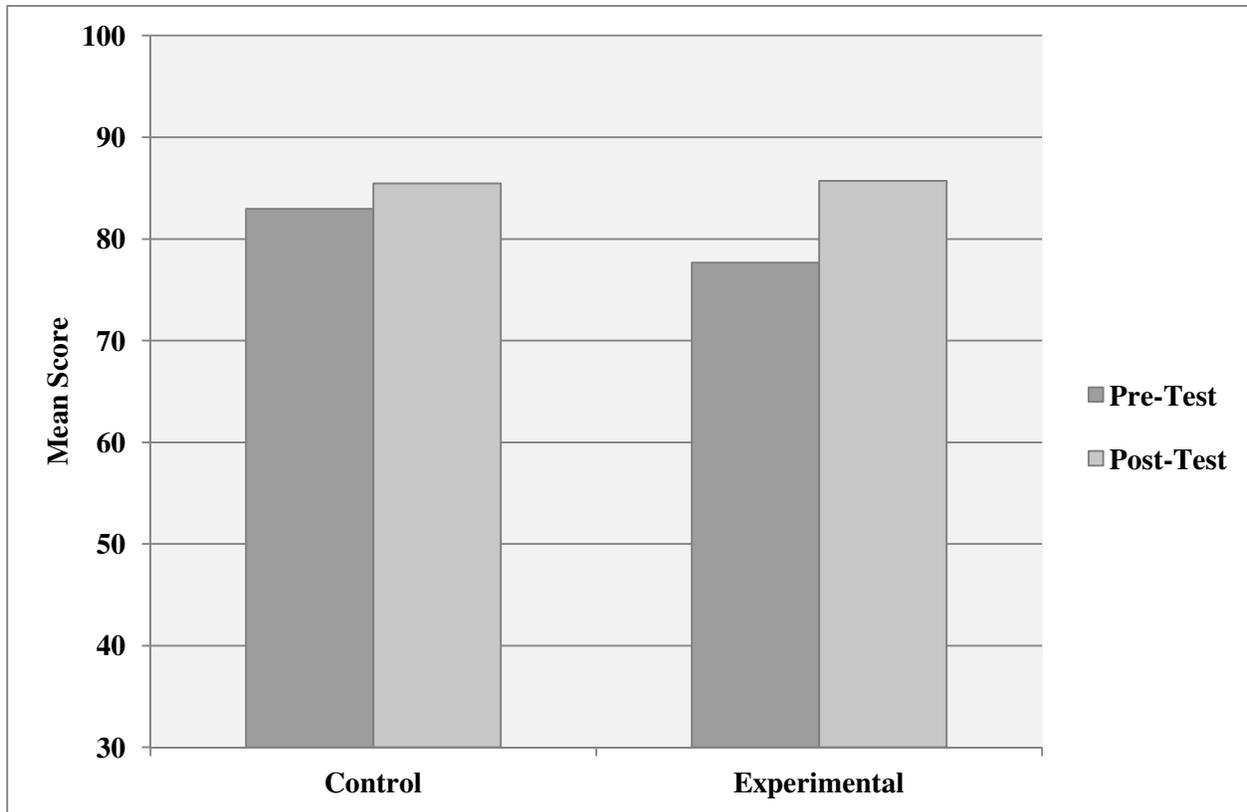


Figure 4. Comparison of pre- and post-test mean scores on SFA: Cognitive/Behavioral Tasks – Personal Care Awareness.

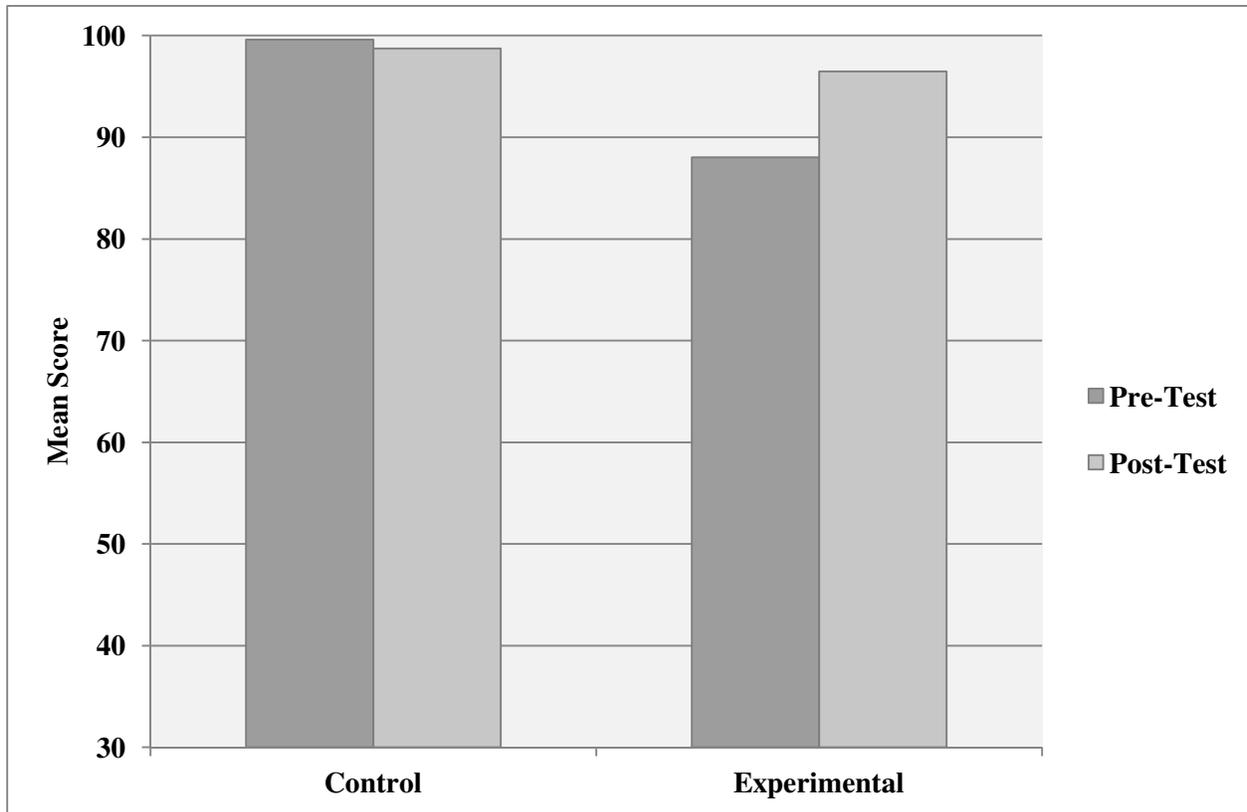


Figure 5. Comparison of pre- and post-test mean scores on SFA: Cognitive/Behavioral Tasks – Safety.

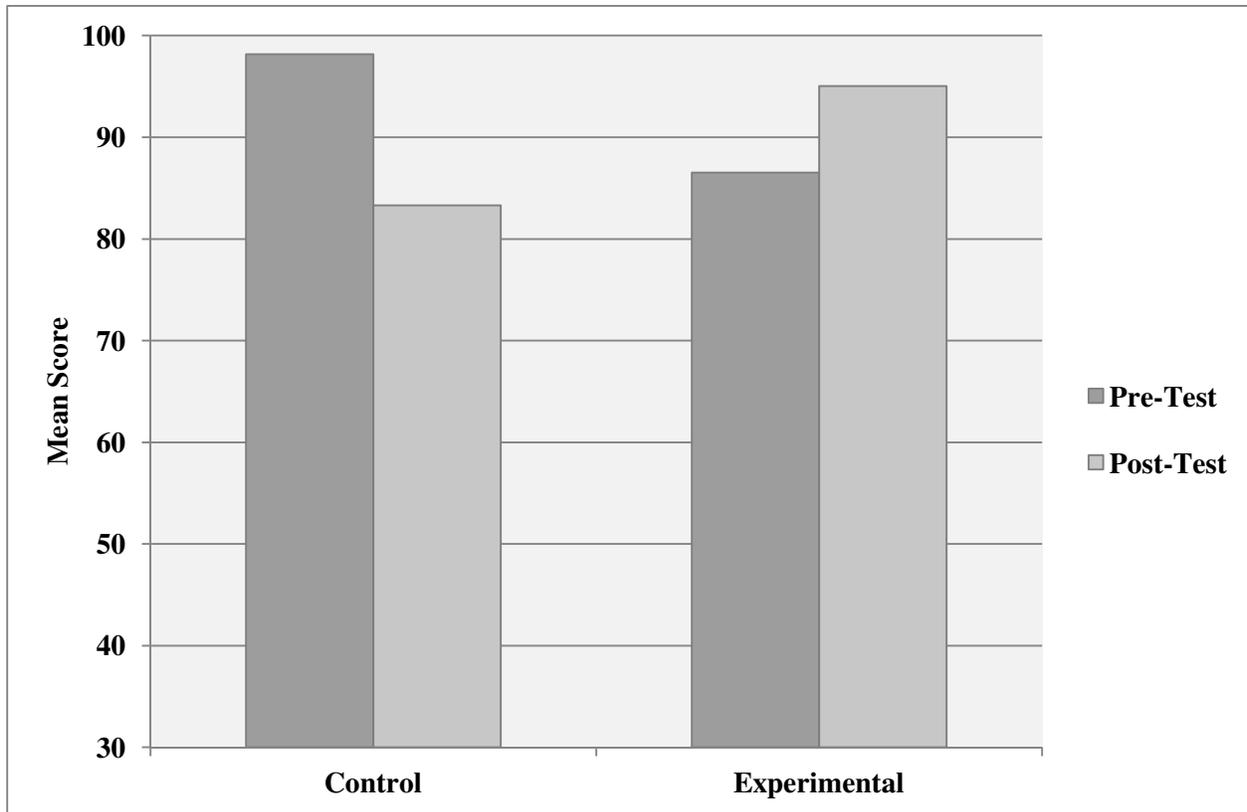


Table 2. Comparison of pre- and post-test mean scores of SPM-Classroom Form.

	Control Group		Experimental Group	
	Pre-test mean score	Post-test mean score	Pre-test mean score	Post-test mean score
Social Participation	20.62 ± 5.82	14.22 ± 4.61	16.39 ± 6.52	14.00 ± 4.45
	p = 0.000*		p = 0.004*	
Vision	9.61 ± 1.54	7.89 ± 1.71	9.73 ± 3.33	8.23 ± 2.82
	p = 0.003*		p = 0.002*	
Hearing	8.68 ± 2.41	7.78 ± 1.80	10.92 ± 4.23	10.58 ± 3.51
	p = 0.025*		p = 0.888	
Touch	8.32 ± 0.75	8.28 ± 0.96	10.30 ± 2.90	10.35 ± 2.17
	p = 1.000		p = 0.430	
Body Awareness	9.55 ± 2.67	8.28 ± 2.80	11.16 ± 4.01	8.73 ± 2.66
	p = 0.011*		p = 0.001*	
Balance and Motion	11.75 ± 3.61	10.56 ± 2.55	13.96 ± 4.71	12.04 ± 3.79
	p = 0.029*		p = 0.008*	
Planning and Ideas	19.90 ± 7.25	13.72 ± 4.13	16.23 ± 6.59	15.27 ± 4.98
	p = 0.002*		p = 0.125	
Total Score	51.90 ± 8.53	45.89 ± 5.67	61.15 ± 16.22	54.96 ± 12.46
	p = 0.000*		p = 0.010*	

n = 47

Values shown are mean ± standard deviation for each group.

\*p < 0.05

Figure 6. Comparison of pre- and post-test mean scores on SPM-MCF: Social Participation.

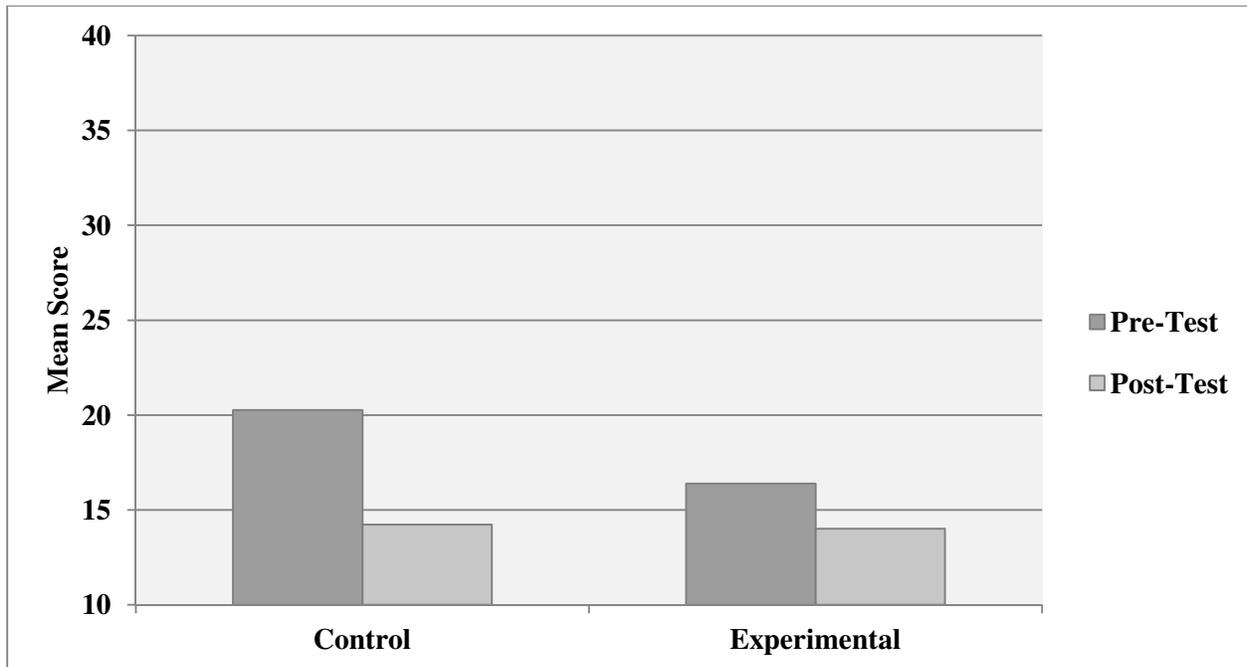


Figure 7. Comparison of pre- and post-test mean scores on SPM-MCF: Vision.

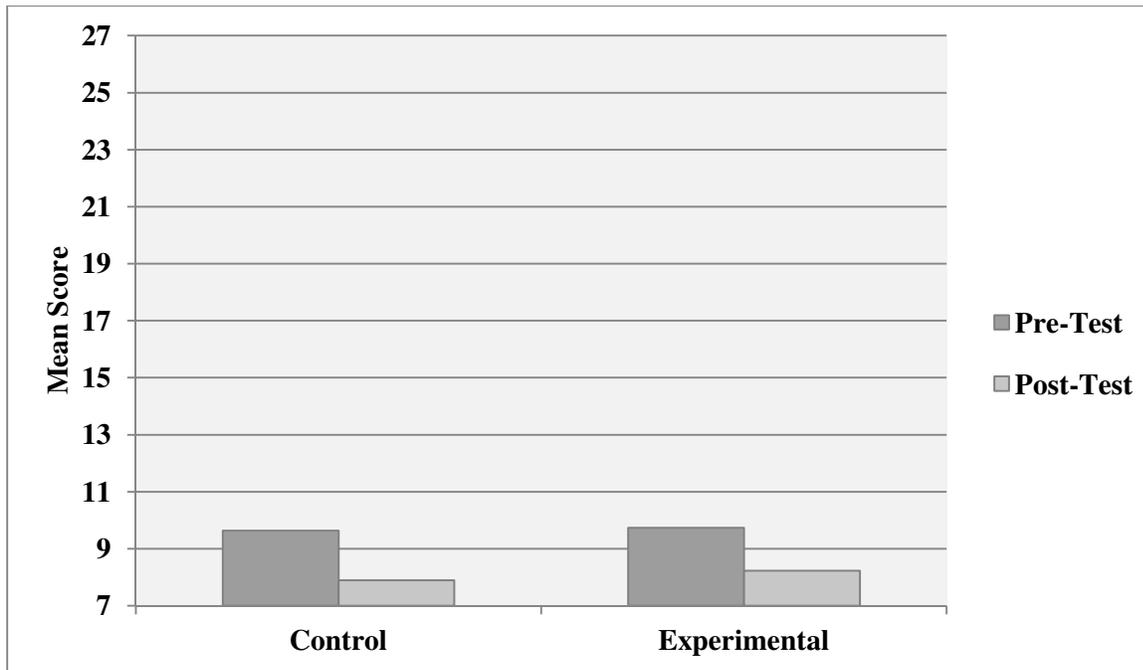


Figure 8. Comparison of pre- and post-test mean scores on SPM-MCF: Hearing.

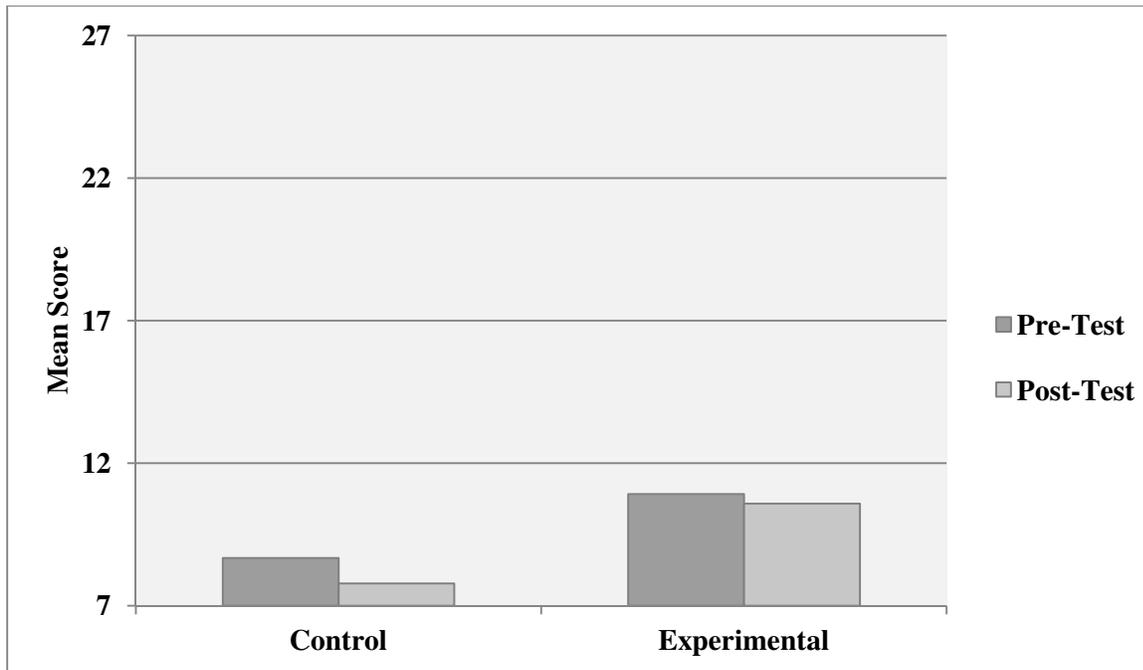


Figure 9. Comparison of pre- and post-test mean scores on SPM-MCF: Body Awareness.

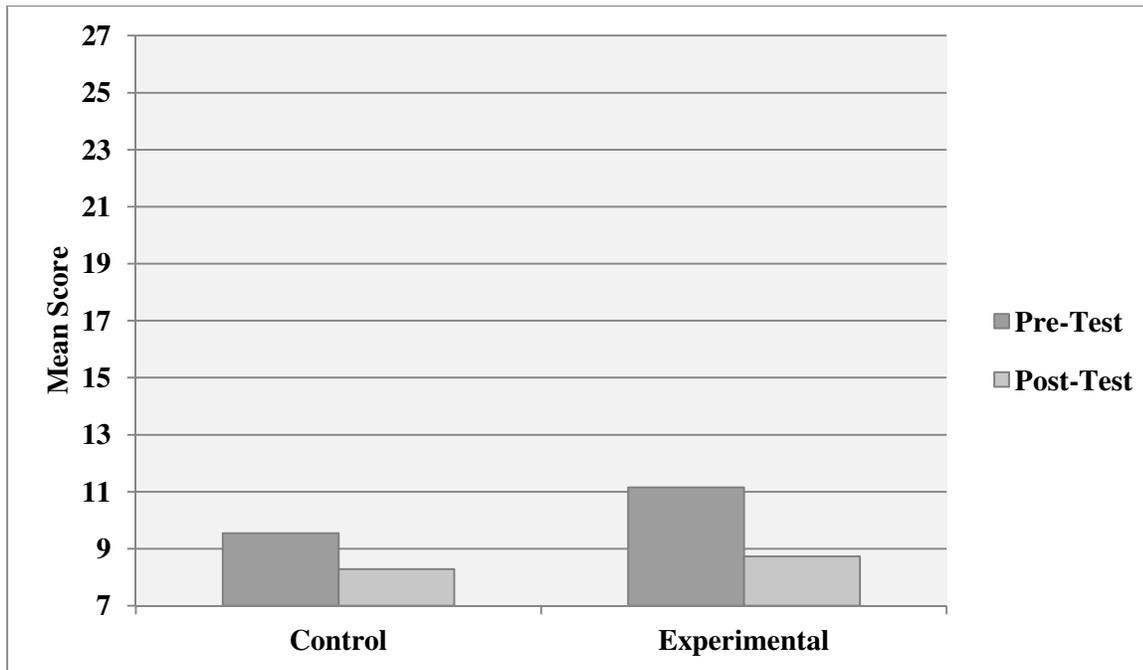


Figure 10. Comparison of pre- and post-test mean scores on SPM-MCF: Balance and Motion.

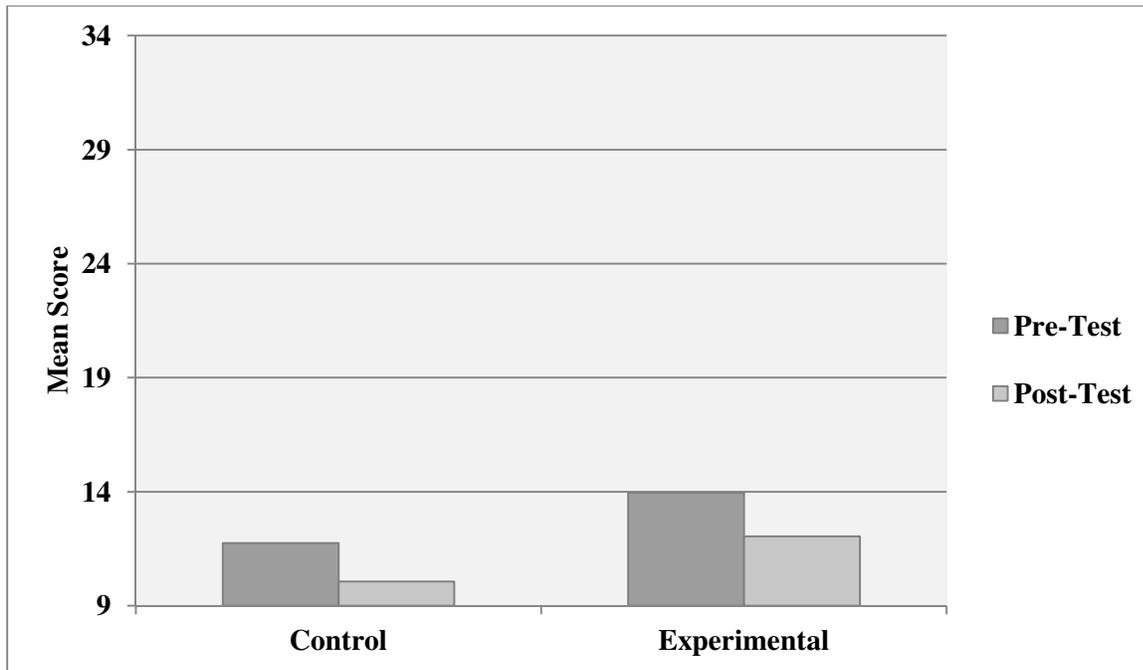


Figure 11. Comparison of pre- and post-test mean scores on SPM-MCF: Planning and Ideas.

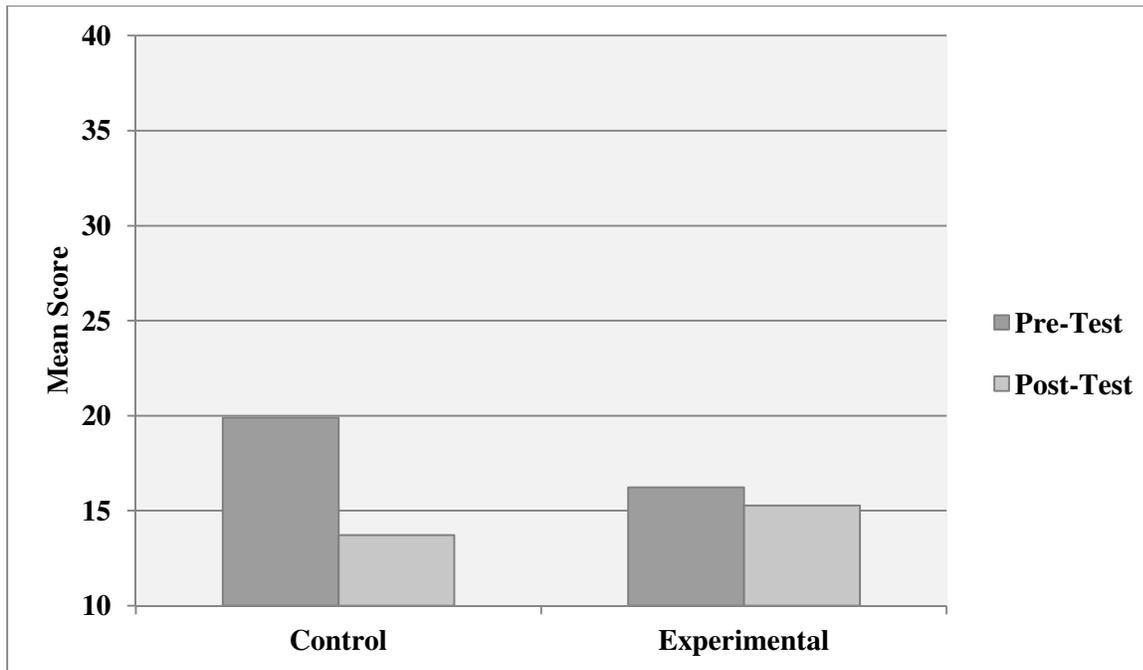


Table 3. Comparison of pre- and post-test mean scores of SPM-Home Form.

	Control Group		Experimental Group	
	Pre-test mean score	Post-test mean score	Pre-test mean score	Post-test mean score
Social Participation	16.25 ± 5.97	16.25 ± 4.63	13.80 ± 3.04	14.08 ± 3.74
	p = 0.622		p = 0.337	
Vision	13.90 ± 3.64	12.56 ± 1.79	12.16 ± 1.97	11.50 ± 0.72
	p = 0.163		p = 0.137	
Hearing	10.65 ± 3.58	10.00 ± 3.61	9.56 ± 1.96	9.33 ± 2.20
	p = 0.223		p = 0.355	
Touch	14.60 ± 4.75	13.19 ± 3.12	12.00 ± 1.22	12.13 ± 1.82
	p = 0.019*		p = 0.922	
Body Awareness	14.30 ± 4.18	13.00 ± 4.38	11.40 ± 2.10	10.82 ± 1.87
	p = 0.065		p = 0.199	
Balance and Motion	14.65 ± 3.15	13.19 ± 2.19	12.32 ± 2.09	12.13 ± 1.63
	p = 0.022*		p = 0.857	
Planning and Ideas	13.35 ± 3.92	12.88 ± 4.09	11.28 ± 2.49	10.44 ± 2.52
	p = 0.483		p = 0.047*	
Total Score	73.35 ± 17.04	67.56 ± 13.90	63.04 ± 7.67	61.44 ± 5.89
	p = 0.003*		p = 0.485	

n = 47

Values shown are mean ± standard deviation for each group.

\*p < 0.05

Figure 12. Comparison of pre- and post-test mean scores on SPM-HF: Touch.

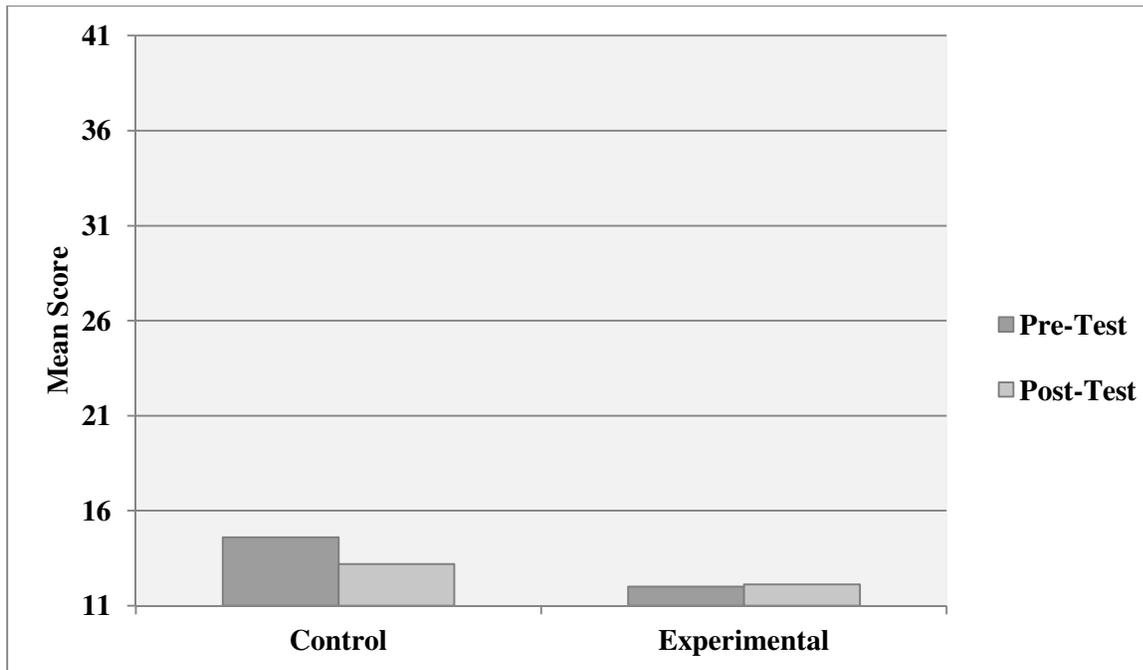


Figure 13. Comparison of pre- and post-test mean scores on SPM-HF: Balance and Motion.

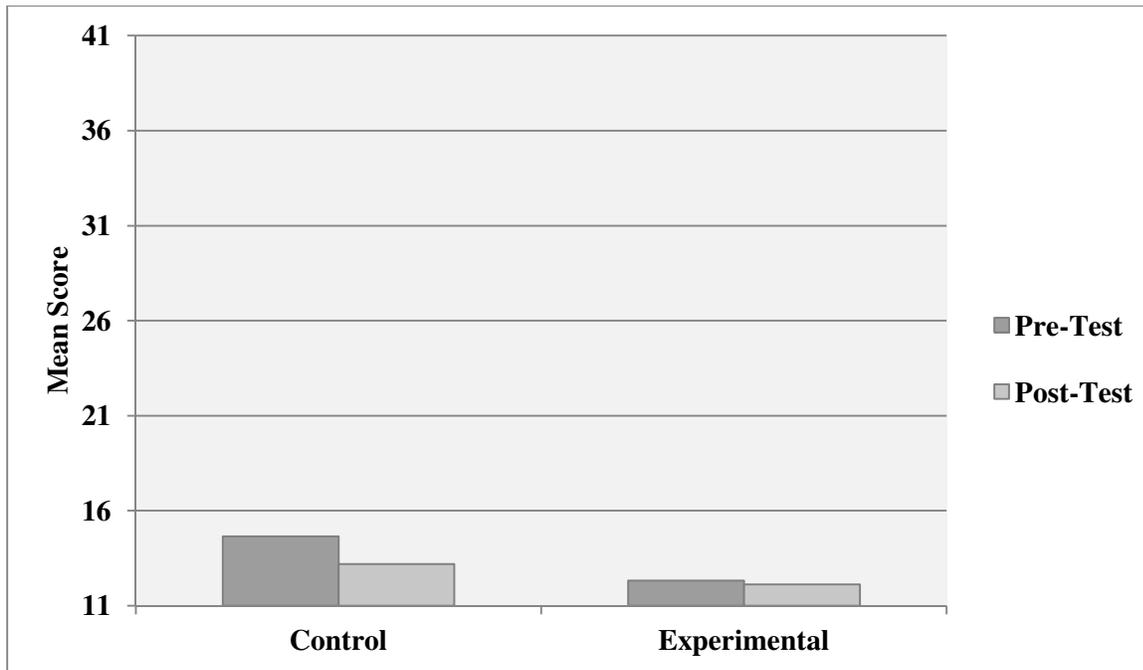


Figure 14. Comparison of pre- and post-test mean scores on SPM-HF: Planning and Ideas.

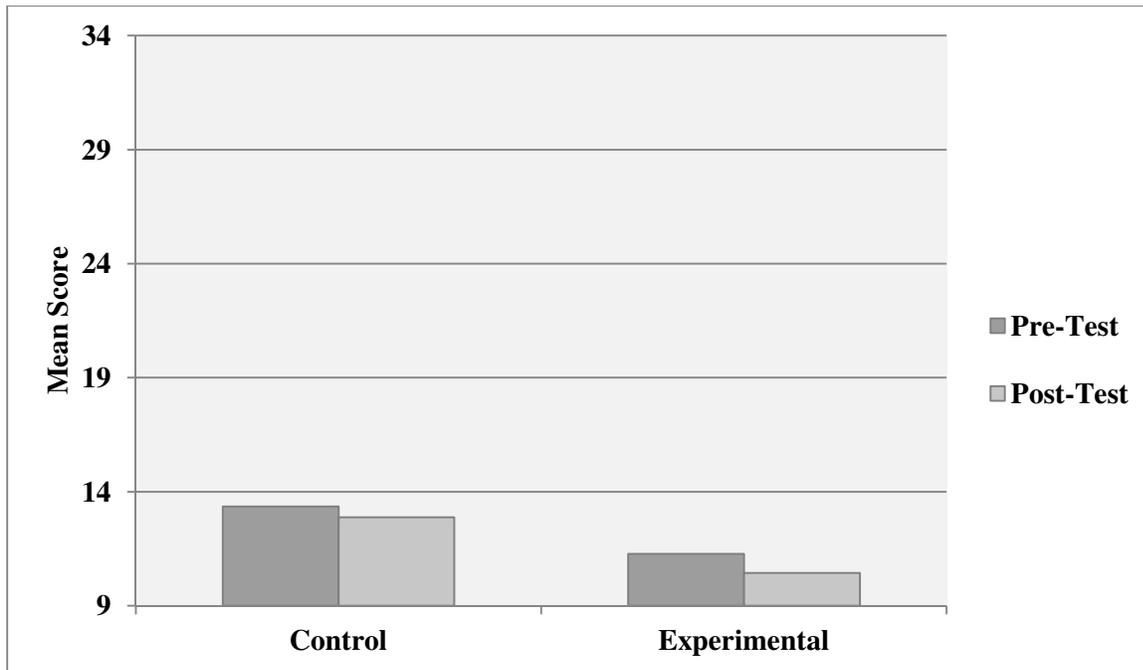


Table 4. Comparison of pre- and post-test mean scores of Sensory Profile.

	Experimental Group	
	Pre-test mean score	Post-test mean score
Tactile Sensitivity	33.00 ± 3.12	33.60 ± 2.19
	p = 0.948	
Taste/Smell Sensitivity	18.65 ± 3.16	17.92 ± 4.08
	p = 0.671	
Movement Sensitivity	14.58 ± 1.14	14.44 ± 1.42
	p = 0.546	
Underresponsive/Seeks Sensation	30.30 ± 4.66	31.28 ± 4.80
	p = 0.054**	
Auditory Filtering	25.50 ± 3.10	27.24 ± 2.62
	p = 0.003*	
Low Energy/Weakness	28.80 ± 2.35	29.40 ± 2.04
	p = 0.034*	
Visual/Auditory Sensitivity	22.58 ± 2.32	23.28 ± 2.26
	p = 0.152	
Total Score	173.38 ± 13.27	176.92 ± 12.74
	p = 0.056**	

Values shown are mean ± standard deviation for each group.

\*p < 0.05

\*\*p-value approaching 0.05

Figure 15. Comparison of pre- and post-test mean scores on SP-SF: Auditory Filtering.

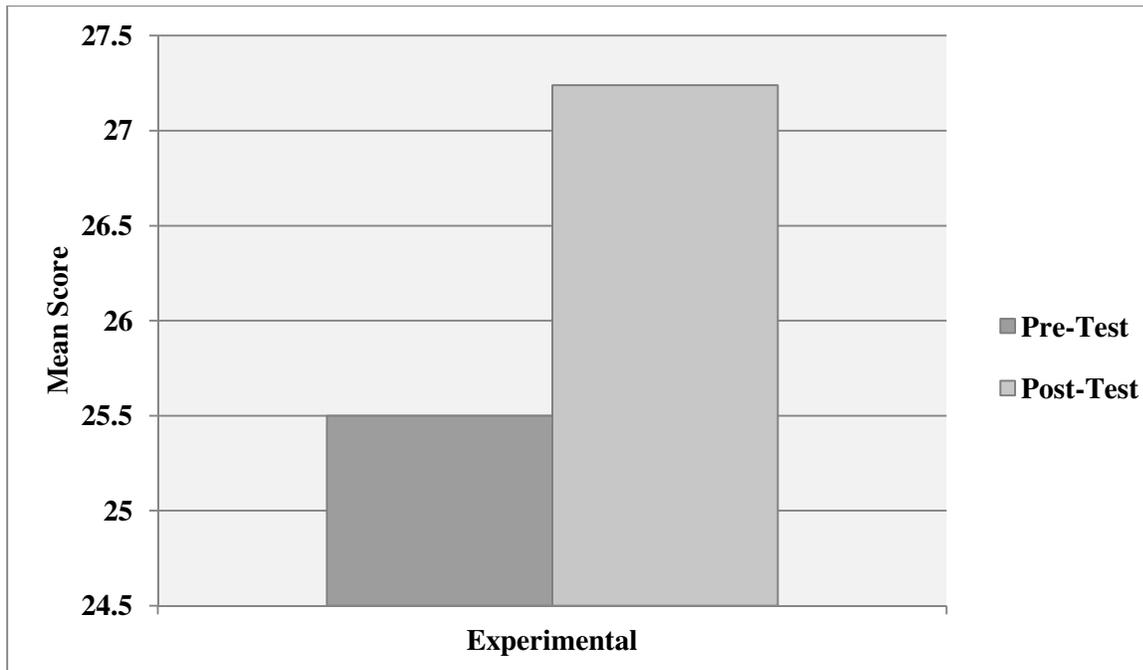
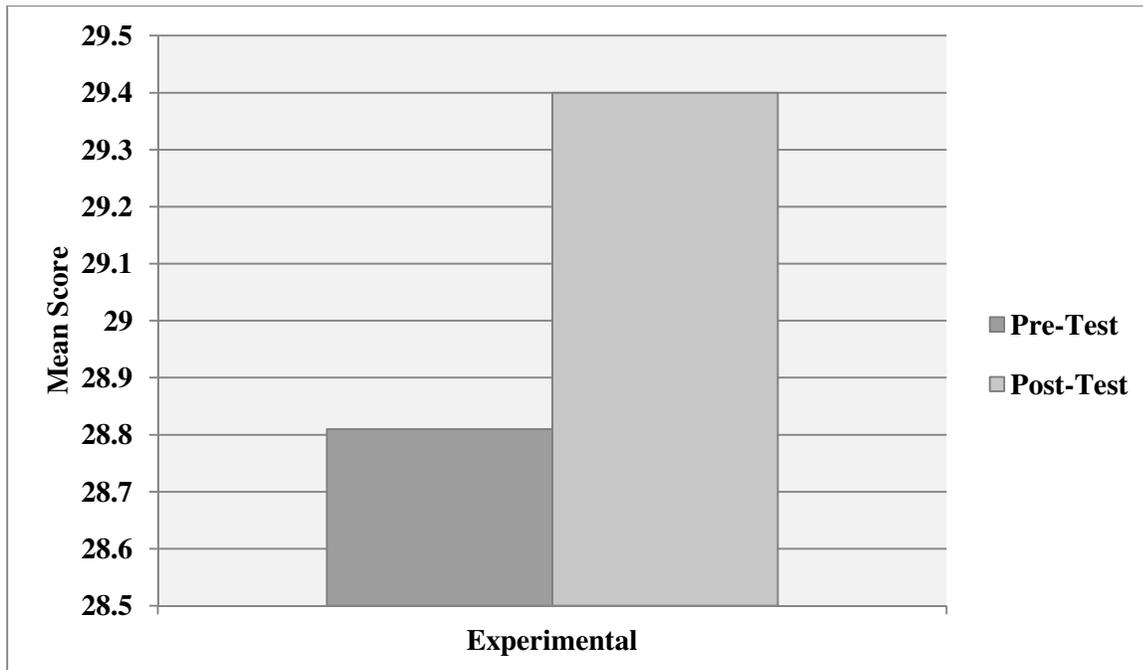


Figure 16. Comparison of pre- and post-test mean scores on SP-SF: Low Energy/Weakness.



## CHAPTER 5: DISCUSSION

The purpose of this study was to examine the effect of implementing the Alert Program® for Self-Regulation in a kindergarten curriculum by utilizing the Response to Intervention (RtI) model. Using three kindergarten classrooms, the results of three separate assessments were scored comparatively to observe if the students made significant improvements in regulation of arousal states for both learning and basic functioning in the classroom using Alert Program® strategies and tools as compared to kindergarteners who did not receive the RtI model with the Alert Program®.

### *Interpretation of Results*

Based on the results of the School Function Assessment (SFA) Part III Activity Performance Cognitive/Behavioral Tasks, the Alert Program® was effective in improving basic functioning in the academic and social aspects of a kindergarten classroom when compared to the control group. Comparing the pre-test and post-test mean scores of the SFA between the control and experimental groups, the students in the experimental group had more gains than the control group. The experimental group had significant improvements in post-test scores in the areas of functional communication, task behavior and completion, positive interaction, personal care awareness, and safety. These five areas play an important role in a kindergartener's understanding of the academic and social aspects of a classroom.

Comparatively, the experimental group, in many circumstances began with lower pre-test values. One could argue that the basis for improvement was not so much in the intervention, but in the starting values. It also could be argued that the Alert Program® was effective in “closing the gap” despite the difference in starting values. Lastly, it could be argued that the control group was artificially limited by their relatively higher pre- test values, in the ability to

demonstrate overall improvement. However, the Alert Program® effect was also seen in some tests where the pretest values were not different, suggesting that the impact was a real effect of the intervention. In addition, in several instances the control group actually showed decreases in several areas (task behavior and completion, behavioral regulation, personal care awareness, and safety), also suggesting that the impact of the intervention was real, and not an artifact of relatively truncated improvement in the control group

The findings of the present study are consistent with those reported by Barnes et al. (2008) who concluded that the Alert Program® may be used to help students learn self-regulatory behaviors that might improve academic and social functioning in the classroom. In particular, the current study's results are also consistent with the conclusion that the Alert Program® is best implemented in a whole classroom setting with teacher collaboration (Barnes et al. 2005). Whole classroom Alert Programming® was carried out in this study, and active teacher collaboration was evidenced by daily Alert Program® based learning centers that were developed by the researchers, but implemented by the classroom teachers.

The results of the Sensory Processing Measure – Home and Classroom Form showed the experimental group and the control group improved in multiple areas of sensory processing. Therefore, it is difficult to determine whether or not the Alert Program® activities and strategies played a role in this effect. The Alert Program® is based on improving sensory processing. The lack of difference between the control and experimental groups in direct measures of the sensory processing using the SPM assessments was unexpected, given the clear difference in performance in the experimental group (SFA). Do these findings invalidate the SFA results? No, there is a great deal of data on validity, reliability for the SFA in the literature, and therefore no reason to believe SFA is invalid. Do these results indicate that the Alert Program®

foundations are invalid? Not likely, because there was an effect measured in the experimental group that wasn't seen in the control group. What can't be determined with certainty is whether the reason there was an alert effect was because of a measureable change in specific elements of sensory processing. There isn't one for one alignment between any element in SFA and any element in SPM. SFA areas often relate to multiple areas of sensory processing. There is the possibility that Alert Program® effects on SPM are hard to pick up against a background of large developmental change in children this age, consistent with the idea that Alert Program® was originally developed for use in children 8 and older.

Previous research has shown that sensory strategies, such as those used the Alert Program®, can be beneficial to reducing self-stimulator behaviors (Smith et al., 2005), increasing playfulness (Bundy et al., 2007), decreasing sensory overresponsivity (Schaaf & Nightlinger, 2007), and making significant improvements on sensory scales when compared to traditional therapy approaches (Miller et al., 2007). To the researchers' knowledge, this is the first report to indicate that The Alert Program® can be an effective way of teaching children this young (kindergarteners aged five to six) how to use self-regulating activities and strategies to influence their arousal states. Shellenberger and Williams (1996) the occupational therapists who developed the Alert Program®, clearly stated that children below the age of eight would not be able to independently identify and change their arousal state using sensory strategies without adult assistance. However, the little previous research that exists for the Alert Program®, results from Barnes et al. (2008) and Bazyk et al. (2009) indicated better awareness of sensory preferences and strategies would be predicted for the kindergarten age, and could be especially true if the kindergarteners received appropriate Stage One and beginning Stage Two Alert Programming activities, as the present study offered. It is not possible to test whether or not

kindergarteners have an understanding of the Alert Program® strategies in order to “change their engine speed”, but it is possible to measure their responses to sensory information, compared to baseline data before the program began. Additionally, although there has yet to be a study to examine the effectiveness of the Alert Program® on academic and social functions in the classroom, this study began to examine this relationship.

An examination of the SPM sensory-based assessments demonstrated improvement in scores in both the control and experimental groups. In fact, in both forms of the Sensory Processing Measure, the experimental group had fewer areas of improvement when compared to the control group. The control group had seven areas of improvement on the classroom form compared to the experimental group’s five areas of improvement; for the Home Form, three areas of improvement compared to one, respectively. In both groups, there was significant disparity between teacher and the parents (classroom vs. home forms). In the experimental group, there was a tendency by the parents to “underestimate” areas of potential weakness in the pre-test, while in the control group; there was a tendency to “overestimate” improvements in the post-test. As a result, there was better agreement between parents and teachers in the experimental group at the end, while in the control group, there was better agreement between parent and teacher assessment at the beginning.

The intent of these measures in general was to determine more directly whether the changes in sensory processing, upon which the Alert Program® is based were measurably affected. Based on these results, this study cannot determine that the teaching of the Alert Program® activities and strategies was effective in improving the kindergarteners’ ability to regulate their arousal state, although the end point measures of performance, as measured by the SFA, were significantly improved. One possibility for the discrepancy is the two instruments

have different sensitivities for the level of effect that can be measured. For example, the level of sensory processing change that is necessary for improvement in SFA may be more subtle than might be required to detect that change in the SPM battery. Given the inconsistencies in reporting between the two groups (teacher vs. parent in both groups), this possibility must be acknowledged. A second possibility is that the program remained too broad to identify specific sensory processing effects. If the RtI model had been fully implemented at Tier 2, students would have had specific areas of weakness identified, and specific activities targeting those limitations would have been assigned for them. It would also have to be acknowledged that the possibility exists there was an as yet undefined “treatment effect” that might have been independent of the Alert programming®. Given the lack of data in this age group, and yet the demonstrated end-effectiveness of the program, perhaps a generalized sensory program effect is more than adequate in this age group. Clearly, additional research is indicated.

An alternative to the SPM, the Sensory Profile – Short Form (SPSF), was also used in the experimental group with the parents. The intent for the researchers was to determine whether a shorter assessment might be as useful since the SPM is relatively long and somewhat challenging to complete. A few effects were identified that were consistent with the findings in the SPM, and given the discrepancies that were noted using the SPM, additional studies utilizing SPSF with the control group clearly are warranted.

### *Clinical Implications*

The results of this study indicate that the School Function Assessment could be a better instrument to examine the effects of the Alert Program® for young children. Neither the Sensory Processing Measure nor the Sensory Profile – Short Form supported the 2nd hypothesis which

may be due to the inability to accurately measure young children's ability to self-regulate arousal states.

Additionally, the Sensory Processing Measure – Home Form and the Sensory Profile – Short Form are filled out by parents/caregivers and may have attributed to the outcome in scores. The researchers found discrepancies between several of the classroom and home forms; where classroom teachers rated a child with definite or probable differences, the parent/caregiver rated the child in the typical range. For example, in the Sensory Processing Measure for the experimental group, only ten out of 27 children were identified as having either probable or definite differences in multiple areas when rated by their parents/caregivers; for the classroom form, 16 out 27 children were identified by the classroom teacher. The opposite was true for the control group – in the same measure, 12 out 20 children were identified as having needs when rated by parents/caregivers while only 10 out 20 were identified when rated by the classroom teacher. In the context of actual outcomes, the researchers found that the forms completed by the classroom teachers proved to be a more accurate description of the child when compared to the home form based on clinical observations. One must also take into account that the home and classroom forms ask different questions; therefore, the child may be experiencing more difficulty in school than at home, or vice versa. In future research, it may prove to be more effective to just use the classroom form instead of both forms to gain an accurate description of the child's sensory behaviors while at school.

Future research may choose to focus solely on the classroom implications of the Alert Program®; therefore, using just the School Function Assessment or the classroom form of the Sensory Processing Measure would be appropriate tools to use. A continuation of this study may wish to examine the effects of implementing the Alert Program® strategies and tools at home;

then the use of home-based assessments would be clearly warranted. Such a study could involve the parents and caregivers more by teaching the students strategies and tool to implement at home and then comparing the results at home versus school.

This study provides the framework for expanding other occupational therapy-based programs into kindergarten curriculums using the Response to Intervention (RtI) model. Occupational therapists working in school systems may find that implementing this method allows for greater ease with screening processes, prevents children from “slipping through the cracks,” and results in greater outcomes for all. By providing occupational therapy-based services to all children using this model, regardless of ability and regardless of the program used, occupational therapists can seamlessly integrate themselves into a general education curriculum and produce significant changes.

#### *Limitations*

Although the sample size of 47 was adequate, the differences between students in a public, rural school and an independent, suburban school cannot be overlooked. Although the demographics of the population were not obtained for this study, it is reasonable to assume there were likely socioeconomical differences between the experimental and control group students. Additionally, such a convenience sample may have influenced the quality of the study. Random assignment of students into experimental and control groups in both sites would have been preferred, and may have produced a stronger effect. The logistics of the study made such an approach impractical, would have reduced by half the numbers in each group at each site, and would have created problems pooling results in control and experimental groups from both schools, especially given the previously mentioned confounding socioeconomic differences. Therefore, the convenience sample approach was considered, on balance, to be the strongest

experimental approach under the circumstances. General extrapolation of these results to a larger scale should be made only with these considerations in mind. While encouraging, these results should not be generalized to other kindergarten classrooms, without further validation and replication.

Another limitation was that the researchers were unable to fully implement the Response to Intervention (RtI) method within the time constraints. The intent was to create small independent learning activities that focused on the identified sensory needs. These groups were to be focused on particular sensory needs as identified by the assessments. The researchers found that time and behavioral constraints were the biggest barriers to the full implementation of Tier 2. Creating all sensory activities from scratch and implementing them with no previous experiences did not allow for much time to create four additional learning centers to be implemented each week. As the researchers became more familiar with the particular sensory needs of the students, questions began to arise about grouping certain students together and what dynamic that would create. Future research would take these limitations into account when planning and implementing the Alert Program® to ensure that these barriers would not limit the study.

### *Conclusion*

The implementation of the Alert Program® into a kindergarten classroom proved to be an effective way to improve student's ability to regulate their arousal state to better attend to the learning and behavioral aspects of the classroom. The specific sensory processing basis for the improvement remains undetermined, at least to the extent SPM measurements can be correlated with SFA outcomes in this study. The long-term effects of the Alert Program® and the ability of

this program to be continually implemented into a kindergarten curriculum have yet to be determined.

The Alert Program® is a successful, occupational therapy-based program that can teach students the tools they need to attend to one of their most important occupations, learning. This study provides insight into the ability of integrating such a program into a kindergarten curriculum, so that all children, not just those with sensory processing difficulties, can better regulate their bodies to learn and play in school.

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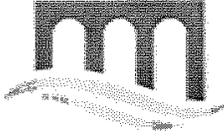
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## APPENDIX A: IRB APPROVAL



### EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board Office  
1L-09 Brody Medical Sciences Building • 600 Moye Boulevard • Greenville, NC 27834  
Office 252-744-2914 • Fax 252-744-2284 • [www.ecu.edu/irb](http://www.ecu.edu/irb)

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**Date:** September 20, 2010

**Principal Investigator:** Dr. Carol A. Lust, EdD, OTR/L  
**Dept./Ctr./Institute:** Department of Occupational Therapy  
**Mailstop or Address:** 3305J LAHN, ECU

**RE:** Exempt Certification  
**UMCIRB#** 10-0477  
**Funding Source:** unfunded

**Title:** "Implementing the Alert Program into a Kindergarten Curriculum Using the Response to Intervention (RtI) Model"

Dear Dr. Lust:

On 9.15.10, the University & Medical Center Institutional Review Board (UMCIRB) determined that your research meets ECU requirements and federal exemption criterion #1 which includes research conducted in established or commonly accepted educational settings, involving normal educational practices, such as research on regular and special education instructional strategies, or research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

It is your responsibility to ensure that this research is conducted in the manner reported in your Internal Processing Form and Protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB Office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification Request at least 30 days before the end of the five year period.

Sincerely,

Chairperson, University & Medical Center Institutional Review Board

Attachments  
Informed Consents

## APPENDIX B: PARENTAL CONSENT FORMS

9-22-10

Dear Kindergarten Parents

Students from Mrs. Byers' and Mrs. Watson's class have been invited to participate in a study with East Carolina University's Department of Occupational Therapy. For five months, starting in September 2010 and ending in March 2011, we would like your child to participate in weekly, small group Alert Program activities for 40-50 minutes. There will be additional opportunities for your child to do 3 optional, follow-up activities during daily center time.

The Alert Program® is an easy-to teach practical program that was developed by two occupational therapists to teach children to recognize their attention level or what will be referred to as an engine level for learning. A wide range of simple, low-budget strategies and activities that are sensorimotor based will be presented. With the help of the classroom teachers and Dr. Lust, your child will begin to determine which sensory strategies/activities he or she likes and will be most helpful in getting their "engine in gear" for learning. Please refer to the handout by Sue Williams titled "Brief Overview of the Alert Program®, 2009" that the teachers shared with you at the beginning of the school year.

There will be adult supervision at all times. If your child asks not to participate in any group activity for that day, his or her wishes will be respected.

The study will ask you and the classroom teacher to rate your child's sensory abilities in September 2010 and then again in March 2011. Your child's teacher will fill out the Sensory Processing Measure – Main Classroom Form and rate your child's performance in cognitive and behavioral tasks using the School Functional Assessment near the end of the first and third marking period.

Parents will complete the Short Sensory Profile and the Sensory Processing Measure. – Home Form. All data will be kept confidential and locked in a file drawer in Dr. Lust's office with limited access.

I am excited to have Dr. Lust and her graduate student back at Oakwood. This program will not disrupt our regular day and I believe the students will really enjoy it.

Please complete the attached permission form and return it to school no later than September 23<sup>rd</sup>. If you have any questions, please feel free to call Dr. Lust at W# 252-744-6193 or H# 252-756-3939.

Warm Regards,

Robert R. Peterson

Head of School

\_\_\_\_\_ **Yes,** my child \_\_\_\_\_

may participate in the 5 month, Alert Program being offered at Oakwood School. I also give my permission for the classroom teacher to complete the Sensory Processing Measure – Main Classroom Form and the School Functional Assessment – the Cognitive/Behavioral Task section in September 2010 and again in March 2012. I also agree to complete the Short Sensory Profile and the Sensory Processing Measure – Home Form in September 2010 and again in March 2012.

\_\_\_\_\_ **No,** my child \_\_\_\_\_

may **not** participate in the 5 month, Alert Program being offered at Oakwood School. I also do **not** give my permission for the classroom teacher to complete the Sensory Processing Measure – Main Classroom Form nor the School Functional Assessment – the Cognitive/Behavioral Task section in September 2010 and again in March 2012. I also do **not** agree to complete the Short Sensory Profile and the Sensory Processing Measure – Home Form in September 2010 and again in March 2012.

---

Parent signature: \_\_\_\_\_

Date: \_\_\_\_\_

**TO:** Williamston Primary School Kindergarten Classroom Parents

**FROM:** Serena Paschal

Williamston Primary School Principal

Carol A. Lust Ed.D, OTR/L

East Carolina University –Principal Research Investigator

**SENT:** 10-6-10

**RE:** Parent permission for you and your child’s teacher to complete 2 assessments in October 2010 (pre-test) and again in March 2011 (post-test).

Our school has been invited to participate in collecting preliminary data for an exciting new research project with East Carolina University’s Department of Occupational Therapy. The project will begin to collect data to learn more about how to help kindergarten students better attend in the classroom. The project will specifically begin looking at your child’s sensory abilities.

We’d like your permission for you and the classroom teacher to rate your child’s sensory abilities in October 2010 and then again in March 2011. Parents will fill out the Sensory Processing Measure – Home Form. Your child’s kindergarten teacher will fill out the Sensory Processing Measure – Main Classroom Form and rate your child’s performance in cognitive and behavioral tasks using the School Functional Assessment near the end of the first and third marking period. All data will be kept confidential and locked in a file drawer in the Principal Investigator’s office with limited outside access. Toward the end of the school year data findings will be shared with our school.

As principal of Williamston Primary School, I have approved this research project and I hope you will support it too.

Please complete the permission form on the next page and return it to school as soon as possible, no later than October 14<sup>th</sup>. If you have questions, please feel free to call the principal investigator, Dr. Carol Lust at W# 252-744-6193 or H# 252-756-3939 or speak with Mrs. Paschal at 252-792-3253.

\_\_\_\_\_ **Yes,**

I support this research project to learn more about how to help improve kindergarten students' attention in the classroom. I give my permission for the classroom teacher to complete the Sensory Processing Measure – Main Classroom Form and the School Functional Assessment – the Cognitive/Behavioral Task section on my child \_\_\_\_\_ (name) in October 2010 and again in March 2011. I also agree to complete the Sensory Processing Measure – Home Form in October 2010 and again in March 2011.

\_\_\_\_\_ **No,**

I **do not** support this research project to learn more about how to help improve kindergarten students' attention in the classroom. I **do not** give my permission for the classroom teacher to complete the Sensory Processing Measure – Main Classroom Form and the School Functional Assessment – the Cognitive/Behavioral Task section on my child \_\_\_\_\_ (name) in October 2010 and again in March 2012. I **do not** agree to complete the Sensory Processing Measure – Home Form in October 2010 and again in March 2011.

**Parent/Guardian signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

APPENDIX C: SCHOOL FUNCTION ASSESSMENT



# School Function Assessment RECORD FORM

## Student Information

Name: \_\_\_\_\_ Date of Assessment: \_\_\_\_\_ Yr / Mo / Day  
 Gender: Male \_\_\_\_\_ Female \_\_\_\_\_ Date of Birth: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 School: \_\_\_\_\_ Grade: \_\_\_\_\_ Age at Assessment: \_\_\_\_\_  
 Primary Classroom Teacher: \_\_\_\_\_  
 Student rated relative to peers in:  Regular Education Program  Special Education Program

## Respondent Information

Name: \_\_\_\_\_ Relationship to Student: \_\_\_\_\_  
 Name: \_\_\_\_\_ Relationship to Student: \_\_\_\_\_  
 Name: \_\_\_\_\_ Relationship to Student: \_\_\_\_\_  
 SFA Coordinator: \_\_\_\_\_

## Student Information

**Language(s) used by student** \_\_\_\_\_

**Primary means of communication** (if more than one means is used, number according to frequency: 1=most frequent, 2, 3, etc.)

	Receptive	Expressive
verbal	<input type="checkbox"/>	<input type="checkbox"/>
written/pictorial	<input type="checkbox"/>	<input type="checkbox"/>
sign/fingerspell	<input type="checkbox"/>	<input type="checkbox"/>
gesture/body movements	<input type="checkbox"/>	<input type="checkbox"/>
communication board	<input type="checkbox"/>	<input type="checkbox"/>
computer/electronic	<input type="checkbox"/>	<input type="checkbox"/>

**Primary method used for written work** (if more than one means is used, number according to frequency: 1=most frequent, 2, 3, etc.)

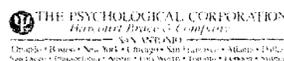
writing by hand  computer  
 dictation  Braille writer  
 other (specify) \_\_\_\_\_

**Primary means of mobility** (if more than one means is used, number according to frequency of use: 1=most frequent, 2, 3, etc.)

walks on own  crutches, cane, or walker  
 wheelchair (manual)  wheelchair (electric)  
 other (specify) \_\_\_\_\_

**Primary means of transportation to/from school**

regular school bus  adapted vehicle  
 car  walk  
 other (specify) \_\_\_\_\_



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20 A B C D E

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## PART III Activity Performance Cognitive/Behavioral Tasks

### Functional Communication

Consider any established mode of communication (e.g., verbal, sign, computer, writing, communication board). Ratings should be based on interpretability by others who are knowledgeable of the mode used.

1. Communicates yes/no, acceptance/refusal, or choice between 2 or more items. . . . .	1 2 3 4
2. Communicates "hungry" or "thirsty." . . . .	1 2 3 4
3. Communicates "sick," "hurt," or "help." . . . .	1 2 3 4
4. Communicates need for help with a functional (nonacademic) task (e.g., toileting, opening a container). . . . .	1 2 3 4
5. Communicates first and last name. . . . .	1 2 3 4
6. Communicates where something is located in classroom or school. . . . .	1 2 3 4
7. Communicates short messages to another person. . . . .	1 2 3 4
8. Communicates inquiries/requests for information. . . . .	1 2 3 4
9. Communicates short messages from one person to another (e.g., teacher to principal). . . . .	1 2 3 4
10. Communicates basic safety information. . . . .	1 2 3 4
11. Describes an object well enough to enable correct identification. . . . .	1 2 3 4
12. Communicates where he/she would go or what he/she would do if lost (e.g., on school trips). . . . .	1 2 3 4
13. Communicates complex (3 step) directions to others. . . . .	1 2 3 4
<b>Respondent's Initials</b>	<b>Functional Communication Raw Score</b>

### Memory and Understanding

1. Demonstrates understanding of basic one-step directions or instructions (e.g., come here, stop, go ahead, get book). . . . .	1 2 3 4
2. Demonstrates memory for use of tools and materials as taught (e.g., classroom tools, adapted equipment, specialized items). . . . .	1 2 3 4
3. Demonstrates memory of routines/structures from day to day. . . . .	1 2 3 4
4. Demonstrates memory for where materials belong. . . . .	1 2 3 4
5. Demonstrates memory for directions to/from other areas in/around the school (e.g., does not get lost). . . . .	1 2 3 4
6. Demonstrates understanding of instructions/directions involving prepositions or spatial concepts (e.g., in the box, under the chair). . . . .	1 2 3 4
7. Demonstrates understanding of two-step directions or instructions. . . . .	1 2 3 4
8. Demonstrates memory of game/activity rules (e.g., board games). . . . .	1 2 3 4
9. Demonstrates understanding of (follows) directions/instructions involving conditional, temporal or sequential concepts (e.g., if/then, after, later, first/second). . . . .	1 2 3 4
10. Demonstrates ability to follow a series of three or more related instructions (e.g., put things away, get your coat, and line up). . . . .	1 2 3 4
<b>Respondent's Initials</b>	<b>Memory and Understanding Raw Score</b>

## PART III Activity Performance Cognitive/Behavioral Tasks (continued)

### Following Social Conventions

1. Eats only own food and drink unless has permission of others. . . . .	1	2	3	4
2. Displays appropriate behavior regarding issues of sexuality (e.g., refrains from explicit sexual talk/acts, private body parts display). . . . .	1	2	3	4
3. Smiles, nods or says "you're welcome" when told "thank you." . . . . .	1	2	3	4
4. Maintains appropriate social/physical boundaries by keeping hands to self, sitting/standing at appropriate distance. . . . .	1	2	3	4
5. Uses good manners, including saying "please," "thank you," and "sorry" when appropriate. . . . .	1	2	3	4
6. Obtains items that are out of reach appropriately (e.g., asks/points rather than reaching over). . . . .	1	2	3	4
7. Observes social conventions regarding appropriate topics and language (e.g., unappetizing topics while eating; bathroom talk). . . . .	1	2	3	4
8. Asks permission in contexts where it is expected (e.g., leaving the room, using some one else's possessions). . . . .	1	2	3	4
9. Respects others' privacy. . . . .	1	2	3	4
10. Apologizes for unintentional mistakes (e.g., bumping into another person). . . . .	1	2	3	4
11. Demonstrates recognition of how and when to communicate about private matters (e.g., toileting accident). . . . .	1	2	3	4
12. Observes social conventions regarding asking questions or making statements that are embarrassing or hurtful of others. . . . .	1	2	3	4
<b>Respondent's Initials</b>	<b>Following Social Conventions Raw Score</b>			

### Compliance With Adult Directives and School Rules

1. Proceeds as directed when told "yes" or "begin." . . . . .	1	2	3	4
2. Cooperates with non-routine commands and directions given by teacher or other responsible adult. . . . .	1	2	3	4
3. Cooperates when asked to help with cleanup and other classroom chores. . . . .	1	2	3	4
4. Observes rules regarding allowed versus restricted objects in classroom. . . . .	1	2	3	4
5. Observes rules concerning allowed versus off-limits or restricted areas. . . . .	1	2	3	4
6. Stops activity immediately when told to do so. . . . .	1	2	3	4
7. Observes rules governing movement around the classroom (e.g., lining up, changing seat). . . . .	1	2	3	4
8. Shows care in use and handling of others' property. . . . .	1	2	3	4
9. Observes rules governing bathroom use (e.g., using appropriate amount of toilet paper, disposing of waste appropriately). . . . .	1	2	3	4
10. Observes rules governing movement around the school (e.g., running, walking in line). . . . .	1	2	3	4
11. Observes rules regarding talking. . . . .	1	2	3	4
12. Cleans assigned area and puts things away at appropriate time. . . . .	1	2	3	4
13. Follows time limits set by adult. . . . .	1	2	3	4
14. Raises hand (or makes some other gesture) before asking a question or answering. . . . .	1	2	3	4
15. Keeps belongings organized in assigned space. . . . .	1	2	3	4
<b>Respondent's Initials</b>	<b>Compliance With Adult Directives and School Rules Raw Score</b>			

### PART III Activity Performance Cognitive/Behavioral Tasks (continued)

Task Behavior/Completion	
1. Listens/attends for at least five minutes. . . . .	1 2 3 4
2. Remains in designated play or work area without supervision for a specified time. . . . .	1 2 3 4
3. Attends quietly to/stays focused on audio or visual presentation for at least 20 minutes. . . . .	1 2 3 4
4. Attends to directions/instructions given to a small group of students. . . . .	1 2 3 4
5. Attends to a story or teacher-directed lesson for more than 15 minutes. . . . .	1 2 3 4
6. Stays on task at own work or play for at least 15 minutes. . . . .	1 2 3 4
7. Listens/attends to an entire class activity, presentation, or lecture. . . . .	1 2 3 4
8. Maintains an acceptable level of performance while not working near others. . . . .	1 2 3 4
9. Makes some attempt to modify performance based on teacher's suggestions or constructive feedback. . . . .	1 2 3 4
10. Recovers after failure (i.e., does not give up or lose temper). . . . .	1 2 3 4
11. Initiates work promptly after receiving directions. . . . .	1 2 3 4
12. Identifies materials needed for a particular task. . . . .	1 2 3 4
13. Lets teacher know when task information or specific assistance is needed. . . . .	1 2 3 4
14. Finishes project that takes several days. . . . .	1 2 3 4
15. Asks for help when rules or directions are not clear. . . . .	1 2 3 4
16. Attempts to solve a problem on own before asking for help. . . . .	1 2 3 4
17. Works productively on own work, even while seated in close proximity to others (i.e., ignores distractions). . . . .	1 2 3 4
18. Makes appropriate modifications to task or materials to meet his/her needs (e.g., rearranges desktop to make more space; changes to more functional position; finds a different writing implement). . . . .	1 2 3 4
19. Has good independent work habits and makes efficient use of class time. . . . .	1 2 3 4
Respondent's Initials	Task Behavior/Completion Raw Score

Positive Interaction	
1. Responds appropriately to social interaction by adult. . . . .	1 2 3 4
2. Responds appropriately to social interaction by peer. . . . .	1 2 3 4
3. Waits for turn in group activities. . . . .	1 2 3 4
4. Works/plays in a group without disrupting the play or work of others. . . . .	1 2 3 4
5. Demonstrates independence in social participation (i.e., does not cling to others). . . . .	1 2 3 4
6. Listens/pays attention while others in group are speaking. . . . .	1 2 3 4
7. Shares materials without being reminded. . . . .	1 2 3 4
8. Asks permission to use objects or materials being used by another. . . . .	1 2 3 4
9. Waits turn to speak. . . . .	1 2 3 4
10. Initiates conversations appropriately. . . . .	1 2 3 4
11. Sustains conversations through several exchanges. . . . .	1 2 3 4
12. Offers to help another person. . . . .	1 2 3 4
13. Modulates volume and tone of voice to suit context. . . . .	1 2 3 4
14. Makes positive comments to peers (e.g., on successful performance). . . . .	1 2 3 4
15. Ends conversations appropriately. . . . .	1 2 3 4
16. Negotiates joining an ongoing play or activity group. . . . .	1 2 3 4
17. Works cooperatively with other students on all aspects of a multiple step, goal-directed activity. . . . .	1 2 3 4
18. Initiates topics of interest to others. . . . .	1 2 3 4
19. Listens to others and contributes own views. . . . .	1 2 3 4
20. Negotiates simple plans/decisions and compromises with others. . . . .	1 2 3 4
Respondent's Initials	Positive Interaction Raw Score

## PART III Activity Performance Cognitive/Behavioral Tasks (continued)

### Behavior Regulation

1. Displays appropriate restraint regarding self-stimulation (e.g., refrains from head banging, hand flapping). . . . .	1 2 3 4
2. Accepts unexpected changes in routine. . . . .	1 2 3 4
3. Refrains from provoking others. . . . .	1 2 3 4
4. Uses nonaggressive words and actions. . . . .	1 2 3 4
5. Maintains behavioral control in large groups of students (e.g., cafeteria, assemblies). . . . .	1 2 3 4
6. Hears constructive criticism without losing temper. . . . .	1 2 3 4
7. Uses words rather than physical actions to respond when provoked or angry at others. . . . .	1 2 3 4
8. Seeks adult assistance, if necessary, when experiencing peer conflict, especially conflicts involving violence. . . . .	1 2 3 4
9. Responds to/handles teasing in a constructive way. . . . .	1 2 3 4
10. Handles frustration when experiencing difficulties with school tasks/activities. . . . .	1 2 3 4
11. Shows common sense in words and actions around bullies, gangs, or strangers. . . . .	1 2 3 4
12. Resolves ordinary peer conflicts or problems adequately on his/her own without requesting teacher assistance. . . . .	1 2 3 4
<b>Respondent's Initials</b>	<b>Behavior Regulation Raw Score</b>

### Safety

1. Keeps unsafe objects out of mouth. . . . .	1 2 3 4
2. Reports illness/injury to an adult. . . . .	1 2 3 4
3. Demonstrates caution around electrical outlets, light sockets, and equipment. . . . .	1 2 3 4
4. Demonstrates appropriate caution in situations where falling is possible (e.g., stairs, climbing on play equipment, tipping in chairs). . . . .	1 2 3 4
5. Demonstrates appropriate caution around hot things, including regulating water temperature. . . . .	1 2 3 4
6. Recognizes dangerous areas and situations and adjusts behavior accordingly (e.g., broken glass). . . . .	1 2 3 4
7. Responds to emergency signal by initiating established routine. . . . .	1 2 3 4
8. Identifies an accident or emergency situation and reports it to a teacher or adult. . . . .	1 2 3 4
9. Demonstrates some wariness around unknown individuals who have not been designated as "visitors" by a responsible adult (e.g., seems to understand potential harm). . . . .	1 2 3 4
10. Checks for safety before crossing a traffic area, even when accompanied by another person (e.g., looks/listens before moving into road). . . . .	1 2 3 4
<b>Respondent's Initials</b>	<b>Safety Raw Score</b>

### Personal Care Awareness

- Rate items based on demonstrated awareness that action is needed.
- If student is physically unable to perform activity, rate "1," unless he/she initiates asking others to perform the needed action, in which case rate "2."

1. Wipes face/chin when needed. . . . .	1 2 3 4
2. Washes and dries hands after toileting. . . . .	1 2 3 4
3. Re-dresses self before exiting bathroom or stall. . . . .	1 2 3 4
4. Selects appropriate sex bathroom; checks to see if bathroom/stall is occupied before entering. . . . .	1 2 3 4
5. Blows/wipes nose. . . . .	1 2 3 4
6. Closes the bathroom/stall door for privacy. . . . .	1 2 3 4
7. Wipes self after toileting. . . . .	1 2 3 4
8. Rearranges clothing as needed (e.g., insures that pants zipper is up, skirt is down). . . . .	1 2 3 4
9. Covers mouth and nose with hand or tissue when coughing or sneezing. . . . .	1 2 3 4
10. Brushes, combs, or rearranges hair as needed. . . . .	1 2 3 4
<b>Respondent's Initials</b>	<b>Personal Care Awareness Raw Score</b>

### Ratings Key for Activity Performance

1: Does not perform    2: Partial performance    3: Inconsistent performance    4: Consistent performance

# APPENDIX D: SENSORY PROCESSING MEASURE – CLASSROOM FORM



## Main Classroom Form

**Profile Sheet**  
 Heather Miller Kuhaneck, M.S., OTR/L,  
 Diana A. Henry, M.S., OTR/L,  
 and Tara J. Glennon, Ed.D., OTR/L, FAOTA

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Name (or ID#): \_\_\_\_\_ Age: \_\_\_\_\_ Grade: \_\_\_\_\_ Gender:  M  F

Date this form completed: \_\_\_\_\_ School: \_\_\_\_\_ Teacher: \_\_\_\_\_

Reason for assessment: \_\_\_\_\_

%ile	T	SOC	VIS	HEA	TOU	BOD	BAL	PLA	TOT	T	%ile
80		39-40	26-28	24-28	25-32	25-28	34-36	40	130-168	80	
79			28		23-24	23-24	33	39	119-129	79	
78		38	24	22-23	21-22		31-32	38	117-118	78	
77		37	22-23	21		22			115-116	77	
76		36	20-21	19-20	20		30	37	109-114	76	
75			19	18	19	21	28-29	36	108	75	
>99	74	35		17			27	34-35	99-107	74	99
99	73	34	18		18		26	32-33	96-98	73	99
	72	33	17	16	17	20	24-25	30-31	94-95	72	
98	71						23	29	88-93	71	98
	70	32	16		16	19	22	28	87	70	
97	69	31		15		18	21		84-86	69	97
96	68	30			15	17		27	82-83	68	96
	67		15	14	14	16	20	26	80-81	67	
95	66	29				15	19		78-79	66	95
93	65	28	14	13	13	14		25	74-77	65	93
92	64	27	13				18	24	71-73	64	92
90	63	26		12	12	13	17	23	69-70	63	90
88	62	25	12					21-22	67-68	62	88
86	61	24		11	11	12	16	20	64-66	61	86
84	60	23					15	19	62-63	60	84
82	59	22	11	10		11		18	60-61	59	82
79	58				10		14	17	58-59	58	79
76	57	21	10			10		16	56-57	57	76
73	56	20		9			13		55	56	73
69	55							15	53-54	55	69
66	54	19				9		14	52	54	66
62	53	18	9		9		12		51	53	62
58	52	17		8				13	50	52	58
54	51					8	11		49	51	54
50	50	16						12	48	50	50
46	49	15							47	49	46
42	48		8						46	48	42
38	47	14					10	11	45	47	38
34	46								44	46	34
31	45	13							43	45	31
27	44	12			8				42	44	27
24	43			7					41	43	24
21	42					7			40	42	21
18	41	11							39	41	18
16	40	10	7				9	10	38	40	16

%ile	T	SOC	VIS	HEA	TOU	BOD	BAL	PLA	TOT	T	%ile
Raw Score	▶	_____	_____	_____	_____	_____	_____	_____	_____	_____	◀ Raw Score
T-Score	▶	_____	_____	_____	_____	_____	_____	_____	_____	_____	◀ T-Score
<b>Interpretive Range</b>											
Typical (407-597) <input type="checkbox"/>											
Some Problems (607-697) <input type="checkbox"/>											
Definite Dysfunction (707-807) <input type="checkbox"/>											

**EXAMINER: REMOVE THIS SHEET BEFORE COMPLETING FORM**

**Scores from SPM School Environments Form**

	ART	MUS	PHY	REC	CAF	BUS
Cutoff value:	29	29	28	29	27	19
	<input type="checkbox"/>					

Check box if score is greater than or equal to cutoff value. Check indicates that student displays more problems than is typical in that environment.

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# AutoScore™ Form

Heather Miller Kuhaneck, M.S., OTR/L,  
Diana A. Henry, M.S., OTR/L, and  
Tara J. Glennon, Ed.D., OTR/L, FAOTA

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**Main  
Classroom**

**Teacher Information**

Your Name/ID#: \_\_\_\_\_ Your Relationship to Student: \_\_\_\_\_ Today's Date: \_\_\_\_\_

**Student Information**

Student's Name/ID#: \_\_\_\_\_ Student's Gender:  M  F Student's Age: \_\_\_\_\_ Years \_\_\_\_\_ Months Student's Grade: \_\_\_\_\_

**Race/Ethnicity:**

American Indian/Alaska Native  Asian  Black/African American  Hispanic/Latino  Native Hawaiian/Pacific Islander  White  Other

Comments on child's behavior/functioning: \_\_\_\_\_

**DIRECTIONS**

Please answer the questions on this form based on this *student's typical behavior during the past month*. Use the following rating scale:

**Never:** the behavior *never or almost never* happens

**Frequently:** the behavior happens *much of the time*

**Occasionally:** the behavior happens *some of the time*

**Always:** the behavior *always or almost always* happens

Circle the *one* answer that best describes how often the behavior happens. Try your best to answer all of the questions.

Several questions ask whether this student shows "distress" in certain situations. Showing distress may include verbal expressions (whining, crying, yelling) or nonverbal expressions (withdrawing, gesturing, pushing something away, running away, wincing, striking out).

You may use the space provided above to add any additional comments on this student's behavior or functioning.

Never      Occasionally      Frequently      Always

**PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSES.**

**SOCIAL PARTICIPATION**      *This student...*

- N.....O.....F.....A..... 1. Works as part of a team; is helpful with others.
- N.....O.....F.....A..... 2. Resolves peer conflicts without teacher intervention.
- N.....O.....F.....A..... 3. Handles frustration without outbursts or aggressive behavior.
- N.....O.....F.....A..... 4. Willingly plays with peers in a variety of games and activities.
- N.....O.....F.....A..... 5. Enters into play with peers without disrupting ongoing activity.
- N.....O.....F.....A..... 6. Has friends and chooses to be with them when possible.
- N.....O.....F.....A..... 7. Uses and understands humor when playing with peers.
- N.....O.....F.....A..... 8. Maintains appropriate "personal space" (doesn't stand too close to others during conversation).
- N.....O.....F.....A..... 9. Maintains appropriate eye contact during conversation.
- N.....O.....F.....A..... 10. Shifts conversation topics in accordance with peer interests; doesn't stay stuck on one topic.

**VISION**      *This student...*

- N.....O.....F.....A..... 11. Squints, covers eyes, or complains about classroom lighting or bright sunlight.
- N.....O.....F.....A..... 12. Shows distress at the sight of moving objects.
- N.....O.....F.....A..... 13. Becomes distracted by nearby visual stimuli (pictures, items on walls, windows, other children).
- N.....O.....F.....A..... 14. During instruction or announcement, student looks around or at peers, rather than looking at person speaking or at blackboard.
- N.....O.....F.....A..... 15. Spins or flicks objects in front of eyes.
- N.....O.....F.....A..... 16. Stares intensely at people or objects.
- N.....O.....F.....A..... 17. Shows distress when lights are dimmed for movies and assemblies.

**HEARING**      *This student...*

- N.....O.....F.....A..... 18. Shows distress at loud sounds (slamming door, electric pencil sharpener, PA announcement, fire drill).
- N.....O.....F.....A..... 19. Shows distress at the sounds of singing or musical instruments.
- N.....O.....F.....A..... 20. Does not respond to voices or new sounds.
- N.....O.....F.....A..... 21. Cannot determine location of sounds or voices.
- N.....O.....F.....A..... 22. Makes noises, hums, sings, or yells during quiet class time.
- N.....O.....F.....A..... 23. Speaks too loudly or makes excessive noise during transitions.
- N.....O.....F.....A..... 24. Yells, screams, or makes unusual noises to self.

*continue on back page...*

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PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSES.

Never      Occasionally      Frequently      Always

**TOUCH**      *This student...*

- N.....O.....F.....A..... 25. Shows distress when hands or face are dirty (with glue, finger paints, food, dirt, etc.).
- N.....O.....F.....A..... 26. Does not tolerate dirt on hands or clothing, even briefly.
- N.....O.....F.....A..... 27. Shows distress when touching certain textures (classroom materials, utensils, sports equipment, etc.).
- N.....O.....F.....A..... 28. Is distressed by accidental touch of peers (may lash out or withdraw).
- N.....O.....F.....A..... 29. Does not respond to another's touch.
- N.....O.....F.....A..... 30. Seeks hot or cold temperatures by touching windows, other surfaces.
- N.....O.....F.....A..... 31. Touches classmates inappropriately during class and when standing in line.
- N.....O.....F.....A..... 32. Does not clean saliva or food from face.

**TASTE AND SMELL**      *This student...*

- N.....O.....F.....A..... 33. Shows distress at the tastes or odors of different foods.
- N.....O.....F.....A..... 34. Does not notice strong or unusual odors (glue, paint, markers, etc.).
- N.....O.....F.....A..... 35. Cannot distinguish between odors; does not prefer good smells to bad smells.
- N.....O.....F.....A..... 36. Tries to taste or lick objects or people.

**BODY AWARENESS**      *This student...*

- N.....O.....F.....A..... 37. Spills contents when opening containers.
- N.....O.....F.....A..... 38. Chews or mouths clothing, pencils, crayons, or classroom materials.
- N.....O.....F.....A..... 39. Moves chair roughly (shoves chair under desk or pulls out chair with too much force).
- N.....O.....F.....A..... 40. Runs, hops, or bounces instead of walking.
- N.....O.....F.....A..... 41. Stomps or slaps feet on the ground when walking.
- N.....O.....F.....A..... 42. Jumps or stomps on stairs.
- N.....O.....F.....A..... 43. Slams doors shut or opens doors with excessive force.

**BALANCE AND MOTION**      *This student...*

- N.....O.....F.....A..... 44. Runs hand along wall when walking.
- N.....O.....F.....A..... 45. Wraps legs around chair legs.
- N.....O.....F.....A..... 46. Rocks in chair while seated at desk or table.
- N.....O.....F.....A..... 47. Fidgets when seated at desk or table.
- N.....O.....F.....A..... 48. Falls out of chair when seated at desk or table.
- N.....O.....F.....A..... 49. Leans on walls, furniture, or other people for support when standing.
- N.....O.....F.....A..... 50. When seated on floor, cannot sit up without support.
- N.....O.....F.....A..... 51. Slumps, leans on desk, or holds head up in hands while seated at desk.
- N.....O.....F.....A..... 52. Has poor coordination; appears clumsy.

**PLANNING AND IDEAS**      *This student...*

- N.....O.....F.....A..... 53. Does not perform consistently in daily tasks; quality of work varies widely.
- N.....O.....F.....A..... 54. Is unable to solve problems effectively.
- N.....O.....F.....A..... 55. Bobbles or drops items when attempting to carry multiple objects.
- N.....O.....F.....A..... 56. Does not perform tasks in proper sequence.
- N.....O.....F.....A..... 57. Fails to complete tasks with multiple steps.
- N.....O.....F.....A..... 58. Has difficulty correctly imitating demonstrations (movement games, songs with motions).
- N.....O.....F.....A..... 59. Has difficulty completing tasks from a presented model.
- N.....O.....F.....A..... 60. Demonstrates limited imagination and creativity in play and free time (such as being unable to create new games).
- N.....O.....F.....A..... 61. Plays repetitively during free time; does not expand or alter activity when given opportunity.
- N.....O.....F.....A..... 62. Shows poor organization of materials in, on, or around desk area.

# APPENDIX E: SENSORY PROCESSING MEASURE – HOME FORM



## Home Form Profile Sheet

L. Diane Parham, Ph.D., OTR/L, FAOTA,  
and Cheryl Ecker, M.A., OTR/L

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Name (or ID#): \_\_\_\_\_ Age: \_\_\_\_\_ Grade: \_\_\_\_\_ Gender:  M  F

Date this form completed: \_\_\_\_\_ Reason for assessment: \_\_\_\_\_

%ile	T	SOC	VIS	HEA	TOU	BOD	BAL	PLA	TOT	T	%ile
80		37-40	35-44	29-32	37-44	36-40	35-44	33-36	170-224		80
79		35-36	33-34	27-28	36	34-35	34	31-32	164-169		79
78		34	32	26	34-35	33	33		154-163		78
77			31	25	33	32	31-32	30	142-153		77
76		33	30	24		31	29-30		140-141		76
75		32	28-29	23	32	30	27-28	28	137-139		75
>99	74		27	22	30-31	29	26	28	133-136	74	>99
99	73	31		21	28-29	28	25	27	131-132	73	99
72			26	21	27	27	24	26	129-130	72	
98	71	30	25	20	26	26	24	26	122-126	71	98
70		29	24	19		25		25	119-121	70	
97	69	28	23	18	25	24	23	24	110-118	69	97
96	68		21-22	17	23-24	23	22	24	106-109	68	96
67		27	20	16	22	22		23	103-105	67	
95	66	26		15	21	21	21	22	99-102	66	95
93	65	25	19		20	20	20	21	94-98	65	93
92	64	24	18	14	19	19	19	20	92-93	64	92
90	63	23	17	13	18	18	18	19	88-91	63	90
88	62	22		12					84-87	62	88
86	61		16		17	17	17	18	81-83	61	86
84	60	21			16	16	16	17	79-80	60	84
82	59		15	11	16	15	16		77-78	59	82
79	58	20			15	14	15	16	75-76	58	79
76	57		14					15	73-74	57	76
73	56	19		10	14	13		14	71-72	56	73
69	55	18							70	55	69
66	54		13					14	69	54	66
62	53	17							67-68	53	62
58	52			9	13	12		13	66	52	58
54	51	16						13	65	51	54
50	50		12					12	64	50	50
46	49	15							63	49	46
42	48					11			62	48	42
38	47	14			12			11	61	47	38
34	46						12		60	46	34
31	45	13							60	45	31
27	44							10	60	44	27
24	43	12		8					60	43	24
21	42								59	42	21
18	41		11						59	41	18
16	40	10-11			11	10	11	9	56-58	40	16

**EXAMINER: REMOVE THIS SHEET BEFORE COMPLETING FORM.**

<b>%ile</b>	<b>T</b>	<b>SOC</b>	<b>VIS</b>	<b>HEA</b>	<b>TOU</b>	<b>BOD</b>	<b>BAL</b>	<b>PLA</b>	<b>TOT</b>	<b>T</b>	<b>%ile</b>
<b>Raw Score</b> ▶	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>T-Score</b> ▶	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
<b>Interpretive Range</b>											
Typical (407-597)	<input type="checkbox"/>										
Some Problems (607-697)	<input type="checkbox"/>										
Definite Dysfunction (707-807)	<input type="checkbox"/>										

<b>DIF Calculation</b>	<b>DIF Interpretation</b>	
Home Form TOT T-score _____	<input type="checkbox"/> $DIF \geq 15$ <input type="checkbox"/> $14 \geq DIF \geq 10$ <input type="checkbox"/> $9 \geq DIF \geq -9$ <input type="checkbox"/> $-10 \geq DIF \geq -14$ <input type="checkbox"/> $-15 \geq DIF$	DEFINITE difference: More problems in Home than in Main Classroom
Main Classroom Form TOT T-score _____		PROBABLE difference: More problems in Home than in Main Classroom
Environment Difference (DIF) = _____		NO difference in amount of problems between Main Classroom and Home
		PROBABLE difference: More problems in Main Classroom than in Home
		DEFINITE difference: More problems in Main Classroom than in Home

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# AutoScore™ Form

L. Diane Parham, Ph.D., OTR/L, FAOTA,  
and Cheryl Ecker, M.A., OTR/L

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**WESTERN PSYCHOLOGICAL SERVICES**  
**wps** 12031 Wilshire Boulevard  
Los Angeles, CA 90025-1251  
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**Home**

### Parent/Guardian Information

Your Name/ID#: \_\_\_\_\_ Your Relationship to Child: \_\_\_\_\_ Today's Date: \_\_\_\_\_

### Child Information

Child's Name/ID#: \_\_\_\_\_ Child's Gender:  M  F Child's Age: \_\_\_\_\_ Years \_\_\_\_\_ Months Child's Grade: \_\_\_\_\_

### Race/Ethnicity:

American Indian/Alaska Native  Asian  Black/African American  Hispanic/Latino  Native Hawaiian/Pacific Islander  White  Other

Comments on child's behavior/functioning: \_\_\_\_\_

### DIRECTIONS

Please answer the questions on this form based on your *child's typical behavior during the past month*. Use the following rating scale:

**Never:** the behavior *never* or *almost never* happens

**Frequently:** the behavior happens *much of the time*

**Occasionally:** the behavior happens *some of the time*

**Always:** the behavior *always* or *almost always* happens

Circle the *one* answer that best describes how often the behavior happens. Try your best to answer all of the questions.

Several questions ask whether your child shows "distress" in certain situations. Showing distress may include verbal expressions (whining, crying, yelling) or nonverbal expressions (withdrawing, gesturing, pushing something away, running away, wincing, striking out).

You may use the space provided above to add any additional comments on your child's behavior or functioning.

### PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSES.

Never      Occasionally      Frequently      Always

#### SOCIAL PARTICIPATION *Does your child...*

- N.....O.....F.....A..... 1. Play with friends cooperatively (without lots of arguments)?
- N.....O.....F.....A..... 2. Interact appropriately with parents and other significant adults (communicates well, follows directions, shows respect, etc.)?
- N.....O.....F.....A..... 3. Share things when asked?
- N.....O.....F.....A..... 4. Carry on a conversation without standing or sitting too close to others?
- N.....O.....F.....A..... 5. Maintain appropriate eye contact during conversation?
- N.....O.....F.....A..... 6. Join in play with others without disrupting the ongoing activity?
- N.....O.....F.....A..... 7. Take part in appropriate mealtime conversation and interaction?
- N.....O.....F.....A..... 8. Participate appropriately in family outings, such as dining out or going to a park, museum, or movie?
- N.....O.....F.....A..... 9. Participate appropriately in family gatherings, such as holidays, weddings, and birthdays?
- N.....O.....F.....A..... 10. Participate appropriately in activities with friends, such as parties, going to the mall, and riding bikes/skateboards/scooters?

#### VISION *Does your child...*

- N.....O.....F.....A..... 11. Seem bothered by light, especially bright light (blinks, squints, cries, closes eyes, etc.)?
- N.....O.....F.....A..... 12. Have trouble finding an object when it is part of a group of other things?
- N.....O.....F.....A..... 13. Close one eye or tip his or her head back when looking at something or someone?
- N.....O.....F.....A..... 14. Become distressed in unusual visual environments, such as a bright, colorful room or a dimly lit room?
- N.....O.....F.....A..... 15. Have difficulty controlling eye movement when following objects like a ball with his or her eyes?
- N.....O.....F.....A..... 16. Have difficulty recognizing how objects are similar or different based on their colors, shapes, or sizes?
- N.....O.....F.....A..... 17. Enjoy watching objects spin or move more than most kids his or her age?
- N.....O.....F.....A..... 18. Walk into objects or people as if they were not there?
- N.....O.....F.....A..... 19. Like to flip light switches on and off repeatedly?
- N.....O.....F.....A..... 20. Dislike certain types of lighting, such as midday sun, strobe lights, flickering lights, or fluorescent lights?
- N.....O.....F.....A..... 21. Enjoy looking at moving objects out of the corner of his or her eye?

#### HEARING *Does your child...*

- N.....O.....F.....A..... 22. Seem bothered by ordinary household sounds, such as the vacuum cleaner, hair dryer, or toilet flushing?
- N.....O.....F.....A..... 23. Respond negatively to loud noises by running away, crying, or holding hands over ears?
- N.....O.....F.....A..... 24. Appear not to hear certain sounds?
- N.....O.....F.....A..... 25. Seem disturbed by or intensely interested in sounds not usually noticed by other people?
- N.....O.....F.....A..... 26. Seem frightened of sounds that do not usually cause distress in other kids his or her age?
- N.....O.....F.....A..... 27. Seem easily distracted by background noises such as a lawn mower outside, an air conditioner, a refrigerator, or fluorescent lights?
- N.....O.....F.....A..... 28. Like to cause certain sounds to happen over and over again, such as by repeatedly flushing the toilet?
- N.....O.....F.....A..... 29. Show distress at shrill or brassy sounds, such as whistles, party noisemakers, flutes, and trumpets?

continue on back page...

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W-466A

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PLEASE PRESS HARD WHEN CIRCLING YOUR RESPONSES.

Never	Occasionally	Frequently	Always	
N	O	F	A	<b>TOUCH</b> <i>Does your child...</i> 30. Pull away from being touched lightly?
N	O	F	A	31. Seem to lack normal awareness of being touched?
N	O	F	A	32. Become distressed by the feel of new clothes?
N	O	F	A	33. Prefer to touch rather than to be touched?
N	O	F	A	34. Become distressed by having his or her fingernails or toenails cut?
N	O	F	A	35. Seem bothered when someone touches his or her face?
N	O	F	A	36. Avoid touching or playing with finger paint, paste, sand, clay, mud, glue, or other messy things?
N	O	F	A	37. Have an unusually high tolerance for pain?
N	O	F	A	38. Dislike teeth brushing, more than most kids his or her age?
N	O	F	A	39. Seem to enjoy sensations that should be painful, such as crashing onto the floor or hitting his or her own body?
N	O	F	A	40. Have trouble finding things in a pocket, bag, or backpack using touch only (without looking)?
				<b>TASTE AND SMELL</b> <i>Does your child...</i>
N	O	F	A	41. Like to taste nonfood items, such as glue or paint?
N	O	F	A	42. Gag at the thought of an unappealing food, such as cooked spinach?
N	O	F	A	43. Like to smell nonfood objects and people?
N	O	F	A	44. Show distress at smells that other children do not notice?
N	O	F	A	45. Seem to ignore or not notice strong odors that other children react to?
				<b>BODY AWARENESS</b> <i>Does your child...</i>
N	O	F	A	46. Grasp objects (such as a pencil or spoon) so tightly that it is difficult to use the object?
N	O	F	A	47. Seem driven to seek activities such as pushing, pulling, dragging, lifting, and jumping?
N	O	F	A	48. Seem unsure of how far to raise or lower the body during movement such as sitting down or stepping over an object?
N	O	F	A	49. Grasp objects (such as a pencil or spoon) so loosely that it is difficult to use the object?
N	O	F	A	50. Seem to exert too much pressure for the task, such as walking heavily, slamming doors, or pressing too hard when using pencils or crayons?
N	O	F	A	51. Jump a lot?
N	O	F	A	52. Tend to pet animals with too much force?
N	O	F	A	53. Bump or push other children?
N	O	F	A	54. Chew on toys, clothes, or other objects more than other children?
N	O	F	A	55. Break things from pressing or pushing too hard on them?
				<b>BALANCE AND MOTION</b> <i>Does your child...</i>
N	O	F	A	56. Seem excessively fearful of movement, such as going up and down stairs or riding swings, teeter-totters, slides, or other playground equipment?
N	O	F	A	57. Have good balance?
N	O	F	A	58. Avoid balance activities, such as walking on curbs or on uneven ground?
N	O	F	A	59. Fall out of a chair when shifting his or her body?
N	O	F	A	60. Fail to catch himself or herself when falling?
N	O	F	A	61. Seem not to get dizzy when others usually do?
N	O	F	A	62. Spin and whirl his or her body more than other children?
N	O	F	A	63. Show distress when his or her head is tilted away from the upright, vertical position?
N	O	F	A	64. Show poor coordination and appear to be clumsy?
N	O	F	A	65. Seem afraid of riding in elevators or on escalators?
N	O	F	A	66. Lean on other people or furniture when sitting or when trying to stand up?
				<b>PLANNING AND IDEAS</b> <i>Does your child...</i>
N	O	F	A	67. Perform inconsistently in daily tasks?
N	O	F	A	68. Have trouble figuring out how to carry multiple objects at the same time?
N	O	F	A	69. Seem confused about how to put away materials and belongings in their correct places?
N	O	F	A	70. Fail to perform tasks in proper sequence, such as getting dressed or setting the table?
N	O	F	A	71. Fail to complete tasks with multiple steps?
N	O	F	A	72. Have difficulty imitating demonstrated actions, such as movement games or songs with motions?
N	O	F	A	73. Have difficulty building to copy a model, such as using Legos or blocks to build something that matches a model?
N	O	F	A	74. Have trouble coming up with ideas for new games and activities?
N	O	F	A	75. Tend to play the same activities over and over, rather than shift to new activities when given the chance?

# APPENDIX F: SENSORY PROFILE – SHORT FORM

## Short Sensory Profile



**SENSORY PROFILE**

Winnie Dunn,  
Ph.D., OTR, FAOTA

Child's Name: \_\_\_\_\_ Birth Date: \_\_\_\_\_ Date: \_\_\_\_\_

Completed by: \_\_\_\_\_ Relationship to Child: \_\_\_\_\_

Service Provider's Name: \_\_\_\_\_ Discipline: \_\_\_\_\_

### INSTRUCTIONS

Please check the box that best describes the frequency with which your child does the following behaviors. Please answer all of the statements. If you are unable to comment because you have not observed the behavior or believe that it does not apply to your child, please draw an X through the number for that item. Please do not write in the Section Raw Score Total row.

pts. Use the following key to mark your responses:

- 1 **ALWAYS** When presented with the opportunity, your child always responds in this manner, 100% of the time.
- 2 **FREQUENTLY** When presented with the opportunity, your child frequently responds in this manner, about 75% of the time.
- 3 **OCCASIONALLY** When presented with the opportunity, your child occasionally responds in this manner, about 50% of the time.
- 4 **SELDOM** When presented with the opportunity, your child seldom responds in this manner, about 25% of the time.
- 5 **NEVER** When presented with the opportunity, your child never responds in this manner, 0% of the time.

Item		ALWAYS	FREQUENTLY	OCCASIONALLY	SELDOM	NEVER
<b>Tactile Sensitivity</b>						
1	Expresses distress during grooming (for example, fights or cries during haircutting, face washing, fingernail cutting)					
2	Prefers long-sleeved clothing when it is warm or short sleeves when it is cold					
3	Avoids going barefoot, especially in sand or grass					
4	Reacts emotionally or aggressively to touch					
5	Withdraws from splashing water					
6	Has difficulty standing in line or close to other people					
7	Rubs or scratches out a spot that has been touched					
<b>Section Raw Score Total</b>						
<b>Taste/Smell Sensitivity</b>						
8	Avoids certain tastes or food smells that are typically part of children's diets					
9	Will only eat certain tastes (list: _____)					
10	Limits self to particular food textures/temperatures (list: _____)					
11	Picky eater, especially regarding food textures					
<b>Section Raw Score Total</b>						
<b>Movement Sensitivity</b>						
12	Becomes anxious or distressed when feet leave the ground					
13	Fears falling or heights					
14	Dislikes activities where head is upside down (for example, somersaults, roughhousing)					
<b>Section Raw Score Total</b>						
<b>Underresponsive/Seeks Sensation</b>						
15	Enjoys strange noises/seeks to make noise for noise's sake					
16	Seeks all kinds of movement and this interferes with daily routines (for example, can't sit still, fidgets)					
17	Becomes overly excitable during movement activity					
18	Touches people and objects					
19	Doesn't seem to notice when face or hands are messy					
20	Jumps from one activity to another so that it interferes with play					
21	Leaves clothing twisted on body					
<b>Section Raw Score Total</b>						

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Item		ALWAYS	FREQUENTLY	OCCASIONALLY	SELDOM	NEVER
<b>Auditory Filtering</b>						
22	Is distracted or has trouble functioning if there is a lot of noise around					
23	Appears to not hear what you say (for example, does not "tune-in" to what you say, appears to ignore you)					
24	Can't work with background noise (for example, fan, refrigerator)					
25	Has trouble completing tasks when the radio is on					
26	Doesn't respond when name is called but you know the child's hearing is OK					
27	Has difficulty paying attention					
<b>Section Raw Score Total</b>						
<b>Low Energy/Weak</b>						
28	Seems to have weak muscles					
29	Tires easily, especially when standing or holding particular body position					
30	Has a weak grasp					
31	Can't lift heavy objects (for example, weak in comparison to same age children)					
32	Props to support self (even during activity)					
33	Poor endurance/tires easily					
<b>Section Raw Score Total</b>						
<b>Visual/Auditory Sensitivity</b>						
34	Responds negatively to unexpected or loud noises (for example, cries or hides at noise from vacuum cleaner, dog barking, hair dryer)					
35	Holds hands over ears to protect ears from sound					
36	Is bothered by bright lights after others have adapted to the light					
37	Watches everyone when they move around the room					
38	Covers eyes or squints to protect eyes from light					
<b>Section Raw Score Total</b>						

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**Summary**

**Instructions:** Transfer the score for each section to the Section Raw Score Total column. Plot these totals by marking an X in the appropriate classification column (Typical Performance, Probable Difference, Definite Difference)\*

**SCORE KEY**

- |                  |            |
|------------------|------------|
| 1 = Always       | 4 = Seldom |
| 2 = Frequently   | 5 = Never  |
| 3 = Occasionally |            |

Section	Section Raw Score Total	Typical Performance	Probable Difference	Definite Difference
Tactile Sensitivity	/35	35 ----- 30	29 ----- 27	26 -----
Taste/Smell Sensitivity	/20	20 ----- 15	14 ----- 12	11 ----- 9
Movement Sensitivity	/15	15 ----- 13	12 ----- 11	10 ----- 8
Underresponsive/Seeks Sensation	/35	35 ----- 27	26 ----- 24	23 ----- 17
Auditory Filtering	/30	30 ----- 28	22 ----- 20	19 ----- 16
Low Energy/Weak	/30	30 ----- 26	25 ----- 24	23 ----- 16
Visual/Auditory Sensitivity	/25	25 ----- 19	18 ----- 16	15 ----- 13
<b>Total</b>	<b>/190</b>	<b>190 ----- 155</b>	<b>154 ----- 142</b>	<b>141 ----- 138</b>

\*Classifications are based on the performance of children without disabilities (n = 1,037).

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4 5 6 7 8 9 10 11 12 A B C D E

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APPENDIX G: SAMPLE DAILY SCHEDULE

	September 23, 2010
Materials Needed/Set-up	<p>1 large speedometer and 1 small speedometer            15 pictures displaying Alert levels            1 bean bath with pictures of Alert levels            5 wiggle seats            3 large colored circles            2 scooter boards            3 oral motor toys            28 pieces of Smarties, marshmallows, Tootsie Rolls, and Starbursts            Puzzles            3 bolsters</p>
Activity 1	Morning Song – “In the Middle” in large group(5 minutes)
Activity 2	Learn and do Movement Song – “Boom Chicka Boom” fast and slow in large group(5 minutes)
Activity 3	Teach Alert engine levels & have child identify (individually or with help from class) levels in the pictures & have child put them in the correct spot on the speedometer (10 minutes)
Activity 4	Touch activity – find and identify Alert engine level pictures in bean and discuss (10 minutes)
Activity 5	Oral motor activity – try different oral motor toys and candies with different tastes and textures; discuss preferences (10 minutes)
Activity 6	Motor/heavy work activity – push OT students on scooter boards at different Alert speeds; work on puzzles while lying prone over bolsters (10 minutes)
Activity 7	Gather back into large group, discuss favorite activities of the day, sing “Goodbye Song”

## APPENDIX H: SAMPLE CENTER ACTIVITIES

Weeks: January 24<sup>th</sup> – February 4<sup>th</sup>, 2011

### **Activity 1: Touch**

**Directions: Sit in ball chair.**

#### **Clean Mud**

1. Open the lid of the plastic container that contains the clean mud.
2. Remove 2 handfuls of clean mud and place it on the mat in front of you.
3. Roll out 3 different sized balls (small, medium, large) to make a snowman.
4. You may make 2-3 additional snow shapes if you would like. Try to make them fit inside the outline of the boxes on the mat.
5. When you are done, please put the clean mud back into the plastic container.
6. Good work!

### **Activity 2: Education**

**Directions: Sit on the yellow peanut or place a wiggle seat in your chair.**

#### **Alert Picture Cube and Meter**

1. Take the large red dice and roll it on the table in front of you.
2. Look at the picture on top.
3. Using the Alert meter, move the dial to how you think the person in the picture is feeling (low, just right, or high).
4. Good work!

### **Activity 3: Mouth**

**Directions: Sit on the yellow peanut or place a wiggle seat in your chair.**

#### **Dinosaur Caves**

1. Take 1 straw and blow 1 of the 3 colored puff balls into the correct matching color cave.
2. Now try to blow the 2<sup>nd</sup> and 3<sup>rd</sup> colored puff balls into their correct matching color caves.
3. The cave openings are different sizes so some will be harder than others.
4. When you are done, put the colored puff balls back into the starting positions.
5. Throw your straw away.
6. Good work!

