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The Use of a Sensory Integration Program for Children with Behavioral and Attention Deficits

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THE USE OF A SENSORY INTEGRATION PROGRAM FOR CHILDREN WITH BEHAVIORAL AND ATTENTION DEFICITS

by

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This Scholarly project Paper, submitted by Janel Evanson and Brenna Pitsch in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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Title The Use of a Sensory Integration Program for Children with Behavioral and Attention Deficits

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Degree Master's of Occupational Therapy

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ABSTRACT

One of the challenges facing occupational therapy practitioners today is incorporating treatment approaches into psychosocial and school environments that address the needs of children who have difficulties maintaining an optimal level of arousal, who have a decreased attention span, who are non-engaged and have maladaptive behaviors and impulsivity, and who may have anger management difficulties. These characteristics may coexist with the diagnosis of a sensory integrative dysfunction. As a result, the authors anticipate an increasing demand for the implementation of sensory integration programming in a psychosocial or school setting. An extensive literature review was completed to gain a full understanding of how sensory systems work and their impact on a child's ability to function. The literature reviewed identified that SI programming can be beneficial in both psychosocial and school settings. Also identified through the literature review were: populations in which sensory integration programming has been a successful treatment approach, the effects of sensory dysfunction on behavior and academics, methods of how to effectively implement sensory integration interventions into a treatment plan, and widely accepted assessments used to identify sensory integration dysfunction.

The purpose of this scholarly project was to develop a sensory integration program that can be easily implemented in a psychosocial or school setting. Based on the results of the current research and literature review, the “Can You Regulate?” program manual was developed. It was designed to educate professionals working in the
psychosocial and school settings and to provide them with the appropriate tools to implement the program. The manual is divided into sections and provides an introduction to sensory integration programming and sensory integration treatment tools to be used in the "Can You Regulate?" program.
CHAPTER I
INTRODUCTION

Occupational therapists, along with professionals in healthcare, psychosocial, and/or educational settings, who work with children often question why a child acts the way he or she does. One of the challenges facing occupational therapy practitioners today is incorporating treatment approaches into psychosocial and school environments that address the needs of children who have difficulties maintaining an optimal level of arousal, have a decreased attention span, have non-engaged and maladaptive behaviors and impulsivity, and have anger management difficulties. As a result, professionals take it upon themselves to create strategies to assist these children in everyday activities. Researching through trial and error, reading evidence-based literature, attending continuing education courses, and communicating with team members are a few of these strategies. Through an extensive review of research, the Sensory Integration (SI) treatment approach was found to be beneficial in both psychosocial and school settings for children with sensory needs.

Over the past thirty years, the effectiveness of SI and SI techniques have been discussed and studied. “SI theory refers to how the brain processes sensation and the resulting motor, behavior, emotion, and attention responses” (Miller, Anzalone, Lane, Cermak, & Osten, 2007, p. 135). Children presenting sensory dysfunction may display hyper-responsive, hypo-responsive, or sensory seeking responses to one or more sensory stimuli. When a child is unable to respond appropriately to incoming sensory stimuli, he
or she is unable to self-regulate. The purpose of the product was to develop a sensory integration program that can be easily implemented in a psychosocial or school setting, which will assist children in learning how to self-regulate.

As occupational therapists, it is important to educate fellow professionals about occupational therapy services and the importance of incorporating SI into a child’s everyday routine. To further assist and guide professionals, the authors have completed an extensive literature review and have used the Occupational Adaptation (OA) theory to guide the process of creating a SI program, the “Can You Regulate?” program, for children with specific sensory disorders.

In the OA theory, the child is his or her own agent of change. This is achieved through engaging in the process of change, rather than solely listening and following directions from others. OA consists of occupations, adaptive capacity, and relative mastery. The occupations property includes active involvement in occupations, ensuring the occupation being performed is meaningful to the child, and receiving a product of the occupation that is tangible or intangible. The adaptive capacity property is the child’s ability to perceive his or her own need for change. Relative mastery refers to the process in which the child evaluates his or her response to an occupation, including efficiency, effectiveness, and satisfaction to self and society. The OA theory was chosen because it enables the child to be his or her own agent for change. The child is able to reflect on his or her behaviors, roles, occupations within the roles, the environment which supports the occupations, and those aspects of his or her roles. By learning how to reflect and self-regulate, this will help the child develop insight to what changes he or she should make and therefore lead to relative mastery (Schkade & Schultz, 2003).
In developing the "Can You Regulate?" program, the goal was to educate family members and professionals who serve children with sensory needs. Furthermore, as occupational therapists, it is our goal to become members of a treatment team who provide quality services to children.

The following Chapters II and III include a review of literature and the methodology used to guide the process. Chapter IV includes the product in its entirety. Chapter V is a conclusion which identifies strengths, limitations, and recommendations for the scholarly project.
CHAPTER II
REVIEW OF LITERATURE

Introduction

One of the challenges facing occupational therapy practitioners today is incorporating treatment approaches into an educational environment that address children who have difficulties maintaining an optimal level of arousal, a decreased attention span, nonengaged and maladaptive behaviors, impulsivity, and anger management difficulties. These characteristics, which could also be contributing factors, may coexist with the diagnosis of a sensory integrative dysfunction. As a result, researchers anticipate a demand for the implementation of SI therapy in educational environment, which may be in a psychosocial or school setting.

This chapter is a review of the literature and research used to develop the product. The background of SI, an introduction to the sensory systems, the implementation of SI therapy, and the benefits of SI are described in the literature review below.

Overview of Sensory Integration

Background

SI is defined by Ayres as “the organization of sensation for use. The ‘use’ may be a perception of the body or the world, or an adaptive response, or a learning process, or the development of some neural function.” (Ayres, 1979, p. 184). Ayres, the creator of SI and SI theory, was profoundly interested in how the brain worked and thus conducted several research studies. Her research concentrated on the pediatric population, individuals with
learning disabilities, sensory processing, and sensory integration. According to Ayres (1972a), the objective of the SI approach is to enhance the brain’s ability to learn how to do many things. This approach does not teach new skills, as in other approaches, but trains the brain to perceive, remember, and motor plan (Ayres, 1972a). The findings of her studies enabled Ayres to develop the theory of SI, and assisted her in identifying the importance of the sensory systems (tactile, vestibular, proprioceptive, visual, auditory, olfactory/gustatory) and their significance in sensory integration. Ayres’s findings also enabled her to identify the five categories of SI dysfunction which include: form and space perception disorders; ocular, postural, and bilateral integration disorders; apraxia; tactile defensiveness; and auditory-language disorders (Ayres, 1972b; Hoehn & Baumeister, 1994).

According to Yack, Aquilla, and Sutton (2002), SI begins when an individual first becomes aware of a sensory stimulus. The brain and body must then work together to organize and interpret the sensory information. Sensory dysfunction may occur when the brain is not properly integrating information within the sensory systems (Ayres, 1979). Dysfunction in one system can inevitably lead to dysfunction in one or more systems, causing a child to respond to sensory stimuli in an abnormal way. A child can be hyper-responsive to sensory stimuli, resulting in avoidance of sensory stimulation, anxiousness, and avoidance of specific tasks or activities. A child can also be hypo-responsive to sensory stimuli, resulting in a craving of sensory input, which is needed to maintain attention and to establish new skills (Yack, et al., 2002).

When hypo- or hyper-responsive characteristics are displayed by a child, further observation and testing is required. A team approach is needed to develop an
occupational profile, identify appropriate assessments, and create a treatment plan. Treatment team members may include parents/guardians, teachers, physician/psychiatrist, a physical therapist, a speech pathologist, a case manager, a social worker, or any other professional involved in the child’s well-being. A successful intervention program for a child with SI dysfunction will involve evaluation of all sensory systems, with a concentration on the three main sensory systems. These systems include the tactile, vestibular and proprioceptive systems (American Occupational Therapy Association, 2003).

Sensory Systems

_Tactile System_

Several authors (Ayres, 1979; Kranowitz, 1998; Yack, et al., 2002) describe the tactile system as providing an individual with information for visual perception, motor planning, body awareness, academic learning, emotional security, and social skills. An individual’s body requires constant tactile stimulation to maintain its organization and functioning. Tactile receptors receive sensations of pressure, light touch, vibration, pain, movement, and temperature throughout the body. The protective and discriminative systems make up the tactile system. The protective system is the body’s defensive system, which alerts the body when it comes in contact with harmful stimuli. The discriminative system tells the body whether something is touching the body, or whether the body is touching something. It allows an individual to feel the quality and distinguish the physical properties of an object. When an individual is unable to organize the sensation of touch, dysfunction is present in the processing of the central nervous system. Tactile dysfunction can lead to hypersensitivity, hyposensitivity, or result in poor tactile
discrimination abilities. Tactile dysfunction can essentially lead to interference with motor planning and body awareness.

Tactile activities which are slow and heavy have the potential to create calming effects, whereas fast and light tactile activities create an alerting effect. Deep pressure massages, body painting, and manipulation of clay are a few calming tactile activities, whereas playing in sand boxes, crawling through tunnels, and playing with fidget bags are alerting activities.

**Vestibular System**

According to Ayres (1979), Kranowitz (1998), and Yack, et al. (2002), the vestibular system is the most powerful of the three systems and its input lasts the longest. This system tells an individual the position of the body and head in relation to the earth. This enables an individual to determine if he or she is moving or remaining still, in what direction the movement is, and the speed of the movement. The vestibular system is strongly connected to the visual system as well as the auditory system. The inner ear of the auditory system is the processing center of the vestibular system, receiving sensory information about balance, movement, motor planning, and posture. When these types of sensory information are received, the body, in turn, responds by generating muscle tone to assist in the performance of daily activities.

Protective and discriminative systems are also components of the vestibular system. The protective system warns the body of potentially harmful stimuli, such as prevention of falls. The body’s ability to discriminate acceleration, deceleration, and rotary movement occurs within the discriminative system. When inefficient processing occurs between the inner ear and the receptors in the brain, vestibular dysfunction results.
An individual may be hypo-responsive, hyper-responsive, or receive mixed messages regarding vestibular sensation. This results in the inefficient integration of information about movement, gravity, balance, and space.

Vestibular activities which are slow and heavy have the potential to create calming effects, whereas fast and light vestibular activities create an alerting effect. Swaying in a rocking chair and slow, rhythmical swinging in a hammock are a few calming activities, whereas scooter boards and balance boards are alerting activities.

**Proprioceptive System**

Ayres (1979), Kranowitz (1998), and Yack, et al. (2002) note that the proprioceptive system unconsciously tells an individual about his or her body position in relation to others and objects in the environment. Additional functions of the proprioceptive system include: increased discrimination and body awareness, grading of movement, postural stability, and emotional security. It also contributes to motor planning, motor control, and body expression. Receptors for the proprioceptive system are located in the muscles, tendons, joints, joint capsules, ligaments, and connective tissue. When contraction, stretching, bending, straightening, pulling and compression of a joint or muscle occurs, sensory information is sent to the brain. The brain processes the information, enabling an individual to unconsciously move his or her body parts. When information is inadequately processed, movement and body position is affected. When proprioceptive dysfunction is present, an individual may be hypersensitive or hyposensitize to proprioceptive input.

Proprioceptive activities which are slow and heavy have the potential to create calming effects, whereas fast and light proprioceptive activities create an alerting effect.
Hugging, wall push-ups, and weighted blankets are calming activities, whereas stomping, jumping, and heavy work or push-pull activities are alerting.

SI addresses all sensory systems, but focuses on the three main systems: tactile, vestibular, and proprioceptive systems. These systems are closely related, and at times their functions overlap. Dysfunction in one or all of these systems can have a significant impact on a child’s ability to carry out everyday life tasks. It is up to the occupational therapist and other team members to develop a treatment plan which will meet the specific sensory needs of the child.

Implementation of Sensory Integration Therapy

Assessments used with Sensory Integration

Practitioners and researchers have developed many different assessments to identify SI disorders in children. The most commonly used assessments found in the current literature include: the Southern California Sensory Integration Test (SCSIT; Bumin & Kayihan, 2001; Hoehn & Baumeister, 1994; Humphries, Wright, McDougall & Vertes, 1990; Polatajko, Law, Miller, Schaffer & Macnab, 1991; Uyanik, Bumin & Kayihan, 2003; Wilson, Kaplan, Fellowes, Gruchy & Faris, 1992), the Sensory Integration and Praxis Test (SIPT; Ayres, 1991; AOTA, 2003; Hoehn & Baumeister, 1994; Parham, 1998; Roley, Koomar, Surfus & Irani, 2005; Smith, Press, Koenig & Kinnealey, 2005), and the Southern California Postrotary Nystagmus Test (SCPNT; Hoehn & Baumeister, 1994; Humphries, et al., 1990; Wilson, et al., 1992). For details of the above assessments refer to Appendix A. The literature reviewed also included the use of other assessments such as: the Sensory Profile (Rodger, Brown & Brown, 2005; Roley, et al., 2005), the Brunininks-Oseretsky Test of Motor Proficiency (BOTMP; Humphries,
et al., 1990; Polatajko, et al., 1991; Rodger, et al., 2005; Roley, et al., 2005), the Kaufman Assessment Battery for Children (AOTA, 2003; Parham, 1998), the Sensory Integration Inventory –Revised for Individuals with Developmental Disabilities (SII-R; Smith, et al., 2005; Urwin & Ballinger, 2005), and the Test of Visual Motor Integration (VMI; Humphries, et al., 1990; Rodger, et al., 2005; Stratton & Gailfus, 1998) to help identify individuals with SI dysfunction.

The SCSIT (Brainworks, Inc., 2005) developed by Jean Ayres, was designed to assess perceptual motor skills and help identify SI dysfunction in children. Another test developed by Ayres, the SCPNT is used to measure the duration of nystagmus. Nystagmus is defined as involuntary rapid movement of the eyeball (Friel, 1981). In 1989 the SCSIT and the SCPNT were revised and renamed the SIPT. The SIPT evaluates various areas of a child’s sensory systems, as well as assists in identifying learning and behavior disorders (Ayres, 1991).

It is the occupational therapist’s responsibility to choose an appropriate assessment based on history and referral information, and to use the SI framework to develop the child’s treatment plan. Once the full evaluation is completed, the therapist and treatment team develop an intervention plan.

Sensory Integration Therapy and the Occupational Therapy Framework

According to the American Occupational Therapy Association (AOTA, 2002), as part of the comprehensive evaluation, the occupational therapist needs to develop an occupational profile for the child. The occupational profile is a tool that gathers information from the child, family, and treatment team to discover how a child responds to sensory events on a daily basis. It includes a child’s occupational history, patterns of
daily living, interests, values, and needs. The occupational profile may also involve
gathering information about what is important to the child, what is meaningful to the
child, current issues or problems, the child's priorities and goals, and past experiences of
the child. This client-centered approach will assist in gaining insight into the child's point
of view and background.

Following completion of the occupational profile, an evaluation is completed; this
includes examining a child's performance skills, performance patterns, contexts, activity
demands, and client factors. Throughout the development of the treatment plan, the
occupational therapist meets with other team members to assist in developing a child's
goals, recommendations, and discharge plans. During the treatment planning and
intervention process, the occupational therapist integrates evaluation information, frames
of reference, clinical reasoning, evidence-based practice, and outcome areas to develop a
treatment program that meets the needs of the child. (AOTA, 2002; AOTA, 2003).

The occupational therapist refers to the Occupational Therapy Framework:
Domain and Process (AOTA, 2002) to identify an intervention approach, such as:
create/promote, establish/restore, maintain, and modify. Throughout the intervention
process, the occupational therapist continues to modify activities, as well as evaluate the
child's outcome areas to form the just right challenge and provide the child with a
successful intervention program (AOTA, 2002; AOTA, 2003).

Benefits of Sensory Integration Intervention

Sensory Integration Development

The brain is responsible for integration of sensation which impacts a child's daily
functioning, implying the sensory systems provide the foundation for learning. As stated
by Kranowitz (1998) there are four levels of SI. The tactile, vestibular, and proprioceptive systems make up the primary sensory systems, level one. Basic central nervous system functions (touch, hearing, vision, movement, smell, taste, etc.) need to be working to establish the basis for further sensorimotor development. Once a child is able to integrate the primary sensory systems, he or she is able to move up to the next level. The development of the sensorimotor abilities, level two, will enable a child to become aware of body movement, reflexes, balance, posture, bilateral integration and motor planning. As these skills are defined, a child graduates to the third level, perceptual motor skills. At this stage, a child displays a feeling of mastery of environment, adequacy, emotional stability, behavioral control, language and auditory skills, eye-hand coordination skills, etc. Following the mastery of perceptual motor skills, a child matures and develops academic readiness skills, level four. At this level, writing, reading, spelling, numbers, problem solving, sequencing, spontaneous play, creativity, concentration, and forming relationships are all enhanced.

Sensory Diet

According to Wilbarger and Wilbarger (as cited in Yack et al., 2002; Kranowitz, 1998) a sensory diet is a set of planned, scheduled activities, imbedded throughout the day to help individuals achieve or maintain an optimal arousal level. As stated by Williams and Shellenberger (2001), an optimal arousal level is maintained when a child is alert, attentive, and can easily concentrate. Williams and Shellenberger (2001) consider this level of alertness to be optimal for learning. When implementing a sensory diet for the child, parents of the child, an occupational therapist, a physical therapist, a speech therapist, teachers and any other involved adults are responsible for establishing a variety
of sensory diet activities. A sensory diet will include activities that are alerting, calming, and organizing for a child. Alerting activities are applied for children who are under-aroused, whereas calming activities are implemented for children who are over-aroused. As a child understands his or her reactions to specific stimuli, he or she will learn how to self-regulate and maintain an optimal arousal level. In order to self-regulate, a sensory diet must be maintained in all environments (home, school, community, etc.). It is important to tailor the diet to the needs of the child by providing variety and making modifications. Refer to Appendix B for an example of a sensory diet.

*Sensory Integration Outcomes*

Current research indicates that there are several benefits to SI therapy; but benefits children receive from SI therapy are dependent on many factors. Some factors that may influence SI therapy results include the child’s diagnosis, severity of the diagnosis, length of the intervention phase, the therapist’s amount of training in SI, and whether SI treatment is paired with another treatment approach.

*Behavior*

Through research, SI has become popular for its use in decreasing maladaptive behaviors and, therefore, increasing adaptive behaviors which will enable positive interactions with a child’s environment. Urwin and Ballinger (2005), Olson and Moulton (2004), and Smith, et al. (2005) all conducted studies that presented the effectiveness of SI therapy in decreasing maladaptive behaviors. Olson and Moulton (2004) conducted a study where school occupational therapists were asked about the use of weighted vests and its affects. School aged children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), Autism
Spectrum Disorders (ASD), and SI dysfunctions were the most common population treated with the use of weighted vests. The authors also found the length of time weighted vests were worn varied with each therapist; although on average weighted vests are worn for thirty minutes. Overall, weighted vests were used to decrease maladaptive behaviors by calming a child and increasing a child’s ability to attend to tasks.

Urwin and Ballinger (2005) implemented the use of SI therapy in their study. Here, subjects established baseline behaviors in the first 4 weeks, were administered SI therapy for the next 4 weeks, and established baseline behaviors again for the next 4 weeks with the removal of SI therapy. Overall, subjects’ maladaptive behaviors decreased with the implementation of SI therapy and increased with the removal of SI therapy.

Smith, et al. (2005) also used SI therapy as their treatment approach in comparison to table-top activities in children with Pervasive Developmental Disorders (PDD) and Mental Retardation (MR). Results indicated with the use of SI, self-stimulating and self-injurious behaviors decreased by 11% after a one hour latency period, whereas there were no significant differences immediately after each treatment.

Reisman and Blakeney (1991) explored the effects of SI treatment in adult patients with chronic schizophrenia. This study revealed significant improvements in the areas of social competence, social interest, irritability, and manifest psychosis. This study, as well as a study conducted by Moore and Henry (2002), found that as the amount of treatment time increased, maladaptive behaviors decreased. Researchers (Champagne, 2005; Champagne & Stromberg, 2004; Moore & Henry, 2002) identified a positive impact on sensory symptoms with the use of an SI treatment approach. Approaches used
included the Wilbarger protocol, sensory diets, sensory rooms, joint compression, and providing education on different SI treatment techniques. Subjects reported no incidents of self-harm, significantly reduced thoughts of self-injurious behaviors, reduced occurrence of seclusion and restraints, increases in social and leisure participation, and decreased periods of dissociation (Champagne, 2005; Champagne & Stromberg, 2004; Moore & Henry, 2002). This data reveals the effectiveness of SI therapy in psychological settings by proving its effectiveness in populations that are difficult to treat. These studies show the SI treatment approach to be more successful than traditional treatment approaches (Moore & Henry, 2002; Reisman & Blakeney, 1991).

Sensory rooms have been recognized as an integral aspect of sensory therapy in psychiatric care (Baillon, van Diepen & Prettyman, 2002; Champagne, 2005; Champagne & Stromberg, 2004). Champagne and Stromberg’s (2004) results concluded that sensory rooms had a positive impact on 89% of participants. There are many benefits with the implementation of sensory rooms, such as improvements in the areas of concentration, self-awareness, social interaction and communication, exploration of sensory stimuli, adaptive behaviors, and improved staff and client morale.

SI therapy has also been reported as being effective for adults with sensory defensiveness who have not been diagnosed with other pre-existing medical or psychiatric conditions (Pfeiffer & Kinnealey, 2003). Research supports the relationship between sensory defensiveness and anxiety. SI therapy approaches were noted as being influential in decreasing both sensory defensiveness and secondary social-emotional impacts such as anxiety. Results revealed overall anxiety levels being reduced from a moderate/mild level to a minimal level.
Researchers (Case-Smith & Bryan, 1999) also studied the effectiveness of SI therapy on preschool children diagnosed with Autism. These results confirmed a 15% decrease in the frequency of nonengaged behaviors. Stratton and Gailfus (1998) revealed an increase in attention spans during group activities for adolescents and adults diagnosed with Attention Deficit Hyperactivity Disorder and substance abuse with the use of SI therapy. Increased anger control, marked relaxation, and decreased impulsivity were other positive outcomes of SI therapy.

**Academics**

Ayres (as cited in Parham, 1998) presented the idea that:

Higher cognitive skills are wholly dependent on sensorimotor abilities, [and] a child with sensory integrative immaturity . . . will do poorly in school . . . Immature or deficient sensory integration is likely to interfere with the efficiency, ease, or automaticity with which a child handles new information and accomplishes tasks. This, in turn, impedes classroom functioning and creates stress, making the child vulnerable to achievement or behavioral difficulties in the school setting” (p. 107).

Therefore, it is necessary to address the efficacy of SI therapy on academic success for a child.

Several studies have been conducted, revealing both positive and negative outcomes of SI therapy. Humphries, et al. (1990) and Polatajko, et al. (1991) conducted studies comparing the effects of SI therapy to a perceptual motor approach. Humphries, et al. (1990) results showed no gains in the area of academic functioning relevant with the implementation of SI therapy. The Polatajko, et al. (1991) study results showed improvement in academic functioning, although there were no significant differences between the SI group and the perceptual motor group.
SI therapy has also been compared to tutoring on children with motor disabilities and learning disabilities (Wilson, et al., 1992). Results showed the SI group improved in the area of academics just as much as the tutoring group, which required extensive homework.

A longitudinal study on SI therapy and achievement in elementary students was conducted by Parham (1998). This study disclosed a strong association between SI therapy and achievement in mathematics at a younger age; however, this relationship diminished with age. The opposite results were found for reading; SI did not have a strong association with reading at a younger age, but as age increased so did the positive relationship. This suggests SI therapy is related to academic achievement; it implies a cumulative effect over time.

Who is affected?

Urwin and Ballinger (2005) reported that SI therapy can have an impact on not only the client, but also the individuals surrounding them. By providing clients with quiet areas and calming activities, as well as other SI therapy treatments, a positive effect is experienced by individuals, family members, teachers, and staff alike.

In a study by Stratton and Gailfus (1998), participants reported SI therapy to be a client-centered approach which increased their independence, responsibility, and sense of control over their treatment. They stated they felt “a certain sense of power in being able to respond to their environment rather than reacting defensively as they have done in the past” (p. 94).

In addition, Cohn (2001) reported a change in parents’ perspectives with the implementation of SI therapy. Parents noted changes in their children’s self-worth as
shown through initiation to seek challenges and take risks. Another parent stated that when being able to understand the needs of her child and role as a parent, she was then able to advocate for her child.

Conclusion

Based on the literature review, SI therapy has been identified as a beneficial treatment approach for children with sensory dysfunctions. The literature has identified that SI therapy has lasting affects on improving cognitive and academic abilities, attention span, engaged and adaptive behaviors, and maintaining an optimal level of arousal. The implementation of a SI therapy program will not only assist a child in improving in the areas listed above, but it will also positively affect the lives of other individuals involved with the child. The researchers believe the development and incorporation of a SI therapy program into a daily routine will provide practitioners with a treatment approach which is effective in treating children with SI dysfunction.
CHAPTER III

METHODOLOGY

An initial review of literature was conducted to identify the problem to be addressed by this product, which focused on gathering data related to SI therapy for children, SI therapy in psychosocial and educational settings, and how SI therapy is beneficial for children. Based on the literature, the need for a SI program in psychosocial and educational settings was determined.

Following a review of the literature, various materials from books, textbooks, catalogs, and discussion with professionals were collected. It was identified that SI programming can be beneficial in both psychosocial and school settings. Also identified through the literature review were: populations in which SI programming has been a successful treatment approach, the effects of sensory dysfunction on behavior and academics, methods of how to effectively implement SI interventions into a treatment plan, and widely accepted assessments used to identify SI dysfunction.

The product was designed to educate professionals working in psychosocial and school settings and to provide professionals with the appropriate tools to implement the program. The manual is divided into sections and provides an introduction to SI programming and SI treatment tools to be used in the “Can You Regulate?” program. Chapter IV contains a representation of the program manual.
CHAPTER IV

PRODUCT

The purpose of this scholarly project was to develop a SI program, "Can You Regulate?", which can be easily implemented in a psychosocial or school setting. This program is intended to educate children on how to self-regulate, communicate with staff members, and become his or her own agent of change in the areas of: arousal level, attention span, engagement, adaptive behaviors, anger management, and academics. It is also intended that occupational therapists and other health and educational professionals with training in SI theory and intervention, coordinate the program.

The "Can You Regulate?" program is flexible and easily implemented. It provides a variety of activities that may be adapted to meet the needs of a specific child and is a beneficial treatment approach for children with sensory dysfunctions. Using the OA theory as a guide, this program will provide the child with tools to better understand his or her body and its needs and to help self-regulate. As a child understands his or her reactions to specific stimuli, he or she will learn how to self-regulate and maintain an optimal arousal level independently (Schkade & Schultz, 2003).

The "Can You Regulate?" program manual is an informational manual that is reader-friendly. It is divided into sections, beginning with a background of SI. This section discusses the tactile, vestibular, and proprioceptive sensory systems, the benefits of SI intervention, sensory integration outcomes, and how to implement the "Can You Regulate?" program. The manual also includes a variety of activities, which focus on the
vestibular, proprioceptive, and tactile systems. In addition, appendices were included to provide the reader with additional tools for understanding the “Can You Regulate?” program. An outline for implementing SI sessions, a glossary of terms used in the manual, and available resources regarding SI information and equipment were incorporated into the appendices.
Can You Regulate?

A Sensory Integration Program

JANEL EVANSON
BRENNING PITSCH
GAIL BASS, PH. D., OTR/L
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One of the challenges facing occupational therapy practitioners today is incorporating treatment approaches into an educational environment that address children who have difficulties maintaining an optimal level of arousal, a decreased attention span, nonengaged and maladaptive behaviors, impulsivity, and anger management difficulties. These characteristics could be contributing factors and may coexist with the diagnosis of a sensory integration (SI) dysfunction. As a result, researchers anticipate a demand for the implementation of SI therapy in a school or psychosocial setting.

SI is defined by Ayres as “the organization of sensation for use. The ‘use’ may be a perception of the body or the world, or an adaptive response, or a learning process, or the development of some neural function.” (Ayres, 1979, p. 184). According to Ayres (1972a), the objective of the SI approach is to enhance the brain’s ability to learn how to do many things. This approach does not teach new skills, as in other approaches, but trains the brain to perceive, remember, and motor plan (Ayres, 1972a). The findings of her studies enabled Ayres to develop the theory of SI and identify the importance of the sensory systems (tactile, vestibular, proprioceptive, visual, auditory, olfactory/gustatory) and their significance in SI.

According to Yack, Aquilla, and Sutton (2002), SI begins when an individual first becomes aware of a sensory stimulus. The brain and body must then work together to organize and interpret the sensory information. Sensory dysfunction may occur when the brain is not properly integrating information within the sensory systems (Ayres, 1979). Dysfunction in one system can inevitably lead to dysfunction in one or more systems, causing a child to respond to sensory stimuli in an abnormal way. A child can be hyper-responsive to sensory stimuli, resulting in avoidance of sensory stimulation, anxiousness, and avoidance of specific tasks or activities. A child can also be hypo-responsive to sensory stimuli, resulting in a craving of sensory input, which is needed to maintain attention and to establish new skills (Yack, et al., 2002).

Sensory Systems

SI addresses all sensory systems, but focuses on three main systems: tactile, vestibular, and proprioceptive systems. These systems are closely
related, and at times their functions overlap. Dysfunction in any or all of these systems can have a significant impact on a child’s ability to carry out everyday life tasks. Although, it is up to the occupational therapist and other team members to develop a treatment plan which will meet the specific sensory needs of the child.

**Tactile System**

Several authors (Ayres, 1979; Kranowitz, 1998; Yack et al., 2002) describe the tactile system as providing an individual with information for visual perception, motor planning, body awareness, academic learning, emotional security, and social skills. An individual’s body requires constant tactile stimulation to maintain its organization and functioning. Tactile receptors receive sensations of pressure, light touch, vibration, pain, movement, and temperature throughout the body. The protective and discriminative systems make up the tactile system. The protective system is also the body’s defensive system, which alerts the body when it comes in contact with harmful stimuli. Whereas the discriminative system tells the body whether something is touching the body, or whether the body is touching something. It allows an individual to feel the quality and distinguish the physical properties of an object. When an individual is unable to organize the sensation of touch, dysfunction is present in the central nervous system processing. Tactile dysfunction can lead to hyper-responsivity, hypo-responsivity, or result in poor tactile discrimination abilities. Tactile dysfunction can essentially lead to interference with motor planning and body awareness.

Tactile activities which are slow and heavy have the potential to create calming effects, whereas fast and light tactile activities create an alerting effect. Deep pressure messages, body painting, and manipulation of clay are a few calming tactile activities, whereas playing in sand boxes, crawling through tunnels, and playing with fidget bags are alerting activities.

**Vestibular System**

According to Ayres (1979), Kranowitz (1998), and Yack, et al. (2002), the vestibular system is the most powerful of the three systems and its input lasts the longest. This system tells an individual the position of the body and head in relation to the earth. This enables an individual to determine if he or she is moving or remaining still, in what direction the movement is, and the speed of the movement. The vestibular system is strongly connected to the visual system as well as the auditory system, specifi-
cally, the inner ear. This is the processing center of the vestibular system where sensory information is received about balance, movement, motor planning, and posture. In turn, the body responds by generating muscle tone to assist in the performance of daily activities. Protective and discriminative systems are also components of the vestibular system. The protective system warns the body of potentially harmful stimuli, such as prevention of falls. The body’s ability to discriminate acceleration, deceleration, and rotary movement occurs within the discriminative system. When inefficient processing occurs between the inner ear and the receptors in the brain, vestibular dysfunction results. An individual may be hypo-responsive, hyper-responsive, or receive mixed messages regarding vestibular sensation. This results in the inefficient integration of information about movement, gravity, balance, and space.

Vestibular activities which are slow and heavy have the potential to create calming effects, whereas fast and light vestibular activities create an alerting effect. Swaying in a rocking chair and slow, rhythmical swinging in a hammock are a few calming activities, whereas using scooter boards and balance boards are alerting activities.

Proprioceptive System

Ayres (1979), Kranowitz (1998), and Yack, et al. (2002) note that the proprioceptive system unconsciously tells an individual about his or her body position in relation to others and objects in the environment. Additional functions of the proprioceptive system include: increased discrimination and body awareness, grading of movement, postural stability, and emotional security. It also contributes to motor planning, motor control, and body expression. Receptors for the proprioceptive system are located in the muscles, tendons, joints, joint capsules, ligaments, and connective tissue. When contraction, stretching, bending, straightening, pulling and compression of a joint or muscle occurs, sensory information is sent to the brain. The brain processes the information, enabling an individual to unconsciously move his or her body parts. When information is inadequately processed, movement and body position are affected. When proprioceptive dysfunction is present, an individual may be hyper-responsive or hypo-responsive to proprioceptive input.

Proprioceptive activities which are slow and heavy have the potential to
create calming effects, whereas fast and light activities create an alerting effect. Hugging, wall push-ups, and the use of weighted blankets are calming activities, whereas stomping, jumping, and heavy work or push-pull activities are alerting activities.

In order to self-regulate, a sensory diet must be maintained in all environments.

Benefits of Sensory Integration Intervention

Sensory Integration Development

The brain is responsible for integration of sensation which impacts a child's daily functioning, implying that the sensory systems provide the foundation for learning. As stated by Kranowitz (1998), there are four levels of sensory integration. The tactile, vestibular, and proprioceptive systems make up the primary sensory systems, level one. Basic central nervous system functions (touch, hearing, vision, movement, smell, taste, etc.) need to be working to establish the basis for further sensorimotor development. Once a child is able to integrate the primary sensory systems, he or she is able to move up to the next level. The development of the sensorimotor abilities, level two, will enable a child to become aware of body movement, reflexes, balance, posture, bilateral integration and motor planning. As these skills are defined, a child graduates to the third level, perceptual motor skills. At this stage, a child displays a feeling of mastery of environment, adequacy, emotional stability, behavioral control, language and auditory skills, eye-hand coordination skills, etc. Following the mastery of perceptual motor skills, a child matures and develops academic readiness skills, level four. At this level, writing, reading, spelling, numbers, problem solving, sequencing, spontaneous play, creativity, concentration, and forming relationships are all enhanced.

Sensory Diet

According to Wilbarger and Wilbarger (as cited in Yack, et al., 2002) and Kranowitz (1998), a sensory diet is a set of planned, scheduled activities, imbedded throughout the day to help individuals achieve or maintain an optimal arousal level.

The following is a list of sensory diet characteristics:

- An optimal arousal level is maintained when a child is alert, attentive, and can easily concentrate. This level of alertness is considered to be optimal for learning (Williams & Shellenberger, 2001).
When implementing a sensory diet for a child, parents of the child, an occupational therapist, a physical therapist, a speech therapist, teachers and any other involved adults are responsible for establishing a variety of sensory diet activities.

A sensory diet will include activities that are alerting, calming, and organizing for a child.

As a child understands his or her reactions to specific stimuli, he or she will learn how to self-regulate and maintain an optimal arousal level.

In order to self-regulate, a sensory diet must be maintained in all environments (home, school, community, etc.).

It is important to tailor the sensory diet to the needs of the child by providing variety and continuously making modifications.

**Sensory Integration Outcomes**

Current research indicates several benefits to SI therapy; but benefits children receive from SI therapy are dependent on many factors. Some factors that may influence SI therapy results include the child’s diagnosis, severity of the diagnosis, length of the intervention phase, the therapist’s amount of training in SI, and whether SI treatment is paired with another treatment approach.

**Benefits of Sensory Integration**

- SI has become known for its use in decreasing maladaptive behaviors (Urwin & Ballinger, 2005; Olson & Moulton, 2004; Smith, Press, Koenig, & Kinnealey, 2005).

- The use of weighted vests on children diagnosed with ADHD has been found to decrease maladaptive behaviors by calming a child and increasing a child’s ability to attend to tasks (Olson & Moulton, 2004).

- When compared to a table-top activity treatment approach, SI therapy for children diagnosed with Pervasive Developmental Disorders (PDD) was effective in reducing self-stimulating and self-injurious behaviors by 11%, after a one hour latency period (Smith, et al., 2005).

- Significant improvements in the areas of social competence, social interest, irritability, and manifest psychosis have been reported with the use of SI (Reisman & Blakeney, 1991).

- It has been identified that the effectiveness of SI therapy in treating maladaptive behaviors increases as the amount of treatment time increases (Moore & Henry, 2002).
• Other sensory approaches, such as the Wilbarger protocol, sensory diets, sensory rooms, joint compression, and providing education on different SI treatment techniques have had a positive impact on sensory dysfunction symptoms (Champagne & Stromber, 2004; Moore & Henry, 2002).

• In psychosocial settings, subjects have reported no incidents of self-harm, significantly reduced thoughts of self-injurious behaviors, reduced occurrence of seclusion and restraints, increases in social and leisure participation, and decreased periods of dissociation (Champagne & Stromber, 2004; Moore & Henry, 2002).

• SI therapy has proven its effectiveness in psychological settings in populations that are difficult to treat. The SI treatment approach has been more successful than traditional treatment approaches for this population (Moore & Henry, 2002; Reisman & Blakeney, 1991).

• Sensory rooms have had a positive impact on 89% of participants and are recognized as an integral aspect of sensory therapy in psychiatric care (Baillon, van Diepen & Prettyman, 2002; Champagne & Stromber, 2004).

• Through the use of sensory rooms, improvements in the areas of concentration, self-awareness, social interaction, communication, exploration of sensory stimuli, adaptive behaviors, and improved staff and client morale have all been identified (Champagne & Stromber, 2004).

• SI therapy approaches were noted as being influential in decreasing both sensory defensiveness and secondary social-emotional impacts such as anxiety (Pfeiffer & Kinnealey, 2003).

• SI therapy has been effective for preschool children diagnosed with Autism by decreasing the frequency of nonengaged behaviors by 15% (Case-Smith & Bryan, 1999).

• An increase in attention spans during group activities with adolescents and adults diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) and substance abuse have been noted with the use of SI therapy (Stratton & Gailfus, 1998).

• Increased anger control, marked relaxation, and decreased impulsivity are additional positive outcomes of SI therapy (Stratton & Gailfus, 1998).

• Ayres (as cited in Parham, 1998) presented the idea that:

  "Higher cognitive skills are wholly dependent on sensorimotor abilities, [and] a child with sensory..."
integrative immaturity... will do poorly in school... Immature or deficient sensory integration is likely to interfere with the efficiency, ease, or automaticity with which a child handles new information and accomplishes tasks. This, in turn, impedes classroom functioning and creates stress, making the child vulnerable to achievement or behavioral difficulties in the school setting” (p. 107).

- When SI therapy is compared to other approaches, such as the perceptual motor approach or tutoring, improvements have been noted in overall academic functioning as a result of receiving SI therapy (Humphries, Wright, McDougall, & Vertes, 1990; Polatajko, Law, Miller, Schaffer, & Macnab, 1991; Wilson, Kaplan, Fellowes, Cruchy, & Faris, 1992).

- Specific areas of academics that have shown improvements as a result of SI therapy include mathematics and reading (Parham, 1998).

- SI therapy impacts not only the client, but also the individuals surrounding them. By providing clients with quiet areas and calming activities, as well as other SI therapy treatments, a positive affect is experienced by individuals, family members, teachers, and staff alike (Urwin & Ballinger, 2005).

- Participants have described SI therapy as being a client-centered approach which increased their independence, responsibility, and sense of control over their treatment (Stratton & Cailfus, 1998).

- Participants have stated they felt “a certain sense of power in being able to respond to their environment rather than reacting defensively as they have done in the past” (Stratton & Cailfus, 1998, p. 94).

- Parents noted changes in their children’s self-worth as shown through initiation to seek challenges and take risks. Another parent stated that when being able to understand the needs of her child and role as a parent, she was then able to advocate for her child (Cohn, 2001).

Implementation of the "Can You Regulate?" Program

The SI program, "Can You Regulate?", will involve children, therapists, teachers, and other trained staff. Children of all ages and gender may participate in the SI program. Specific SI dysfunction does not need to be present in order to receive the benefits of the program. All children will require supervision while participating in the SI program. Supervision will be provided by SI coordinators,
who may include therapists, teachers, or other trained staff.

The following pages will provide activities specific to tactile, vestibular, and proprioceptive stimulation. Each day the program is run, a variety of activities from all three sensory systems should be incorporated. This will provide the child with tools to help self-regulate. As a child understands his or her reactions to specific stimuli, he or she will learn how to self-regulate and maintain an optimal arousal level independently.

In order to assist program coordinators in implementing the “Can You Regulate?” program, the use of the SI session outline is recommended. This form provides the SI coordinator with structure and organization for carrying out the program; the outline may be used to document the positive and negative aspects of the activity and record which activities are favored by a child. An example of a SI session outline for a child is shown in Appendix A.

**Program Set-up**

The program may be implemented in several different ways to accommodate to the needs of a specific child or a group of children. This program is designed for a psychosocial or school setting. It may be performed in the morning, the afternoon, or both.

It is important to gain a full understanding of each of the activities before implementing them into the program. Many factors should be considered, such as the equipment required, directions and variations of the activity, activity precautions, and the amount of space necessary to complete each activity.

When setting up the program, the first step is to assess the child’s needs and choose appropriate activities. Next, gather all necessary equipment and determine the amount of space required to carry out the “Can You Regulate?” program. Stations should be spread out to provide ample room for participation in each activity; they should also be laid out in a clockwise manner to alleviate difficulty with each transition. Time, stations, and activities should all be analyzed prior to implementing the “Can You Regulate?” program.

**Time**

It is important for the coordinator to first identify the amount of time that is available to run the program. It is rec-
ommended to allow approximately 20 minutes for completion of a session. Although, it is up to the discretion of the coordinator to determine the amount of time available to implement the program within a daily routine.

Stations

A station consists of one activity and may have one child, two children, or a group of children. When choosing the number of stations, a coordinator must take into account the time allotted to complete the session, the number of children participating, and how much time should be spent at each station. It is recommended that approximately 6 stations be used each time the program is run. Each station could be run for 2 minutes and 30 seconds with 1 minute intervals to allow for changing of stations.

Activities

There are four categories of activities to choose from: 1) tactile, 2) vestibular, 3) proprioceptive, and 4) vestibular and proprioceptive. Each time the program is run it is recommended that a variety of sensory activities be chosen. It is important to identify activities that will meet the specific needs of a child or group of children.

The activities are also defined as being alerting, calming, or both, depending on how it is implemented. If a child has a high amount of energy, or an increased arousal level, calming activities should be incorporated into the program; whereas, if a child has a low amount of energy, or a decreased arousal level, alerting activities should be incorporated into the program. Activities of this nature, whether they are calming or alerting, will help to bring the child's arousal level to an optimal level for learning and completion of tasks. Eventually the child will identify activities that will assist in maintaining his or her optimal level of arousal and the child will begin to recognize his or her sensory needs. Additional adaptations may include creating an environment with either bright or dim lighting, as well as calm versus alerting music, in order to set the desired mood.
Tactile Activities

- The tactile system provides an individual with information for visual perception, motor planning, body awareness, academic learning, emotional security, and social skills.

- Tactile receptors receive sensations of pressure, light touch, vibration, pain, movement, and temperature throughout the body.

- Activities may be alerting if course, heavy-textured items are incorporated into the activity. They may also be alerting if movement is quick, sporadic, or irregular.

- Activities may be calming if soft, smooth, light-textured items are incorporated into the activity. They may also be calming if movement is slow, heavy, or rhythmical.

Body Painting

Individual/Partner
Alerting/Calming

Directions: Using different brushes, brush self on arms, legs, back, hands, and feet. Removal of socks permitted.

Variations:
• Use stencil brushes, large or small paint brushes, large or small (1 1/2") paint rollers, etc.
• Change speed, direction, and pressure of brush strokes

Precautions: Do not brush on stomach, chest, neck, or face. Do not use brushes previously exposed to paint or other chemicals.
Name That Object

Individual
Alerting/Calming

Directions: Different objects of nature are placed in a bucket. Close eyes or place bandana over eyes to occlude vision. Place hand in bucket, grab an object, and try to name the object.

Variations:
- Have objects hidden in a substance (i.e. rice, beans, sand, noodles, water, etc.)
- Use objects of nature (i.e. pinecones, leaves, rocks, sticks, etc.)
- Have each person bring an object from home to hide in the bucket and search for

Precautions: Avoid using sharp objects. Make sure all objects are familiar and easy to identify. Account for all objects before and after the activity.
Tactile Activities

Fidget bag
Individual
Alerting/Calm

Directions: Different hand fidgets are placed in a bag. Choosing one object at a time, explore all hand fidgets in the bag.

Variations:
- Pick and describe favorite fidget
- Explain how fidget would be alerting or calming
- Use fidgets with different textures (i.e. squishy, hard, soft, stringy, gooey, stretchy, beany, etc.)
- Use fidgets of different sizes
- Incorporate fidgets with vibration and temperature changes

Precautions: General.
Tunnels
Individual
Alerting/Calming

Directions: Crawl through the tunnel on your stomach.

Variations:
• Crawl through on your back, head first or feet first instead of on your stomach
• Use floor mats
• Use tunnels of different textures (i.e. nylon, spandex, plastic, etc.)
• Go through on a scooter board

Precautions: General.
Fun with Foam

Individual/Partner
Alerting

Directions: Spray foam on clean table. Place hands in foam to draw shapes.

Variations:
• Use shaving cream or canned whipped cream
• Alternate between drawing shapes, letters, designs, numbers, and symbols
• Practice hand writing
• Play games such as tic-tac-toe

Precautions: Use non-toxic materials and refrain from exposure to mouth and eyes.
Building Blocks
Individual
Alerting/Calming

Directions: Use blocks to stack and build objects.

Variations:
• Use different size blocks
• Use different shapes of blocks (i.e. Lincoln Logs, Legos, K’nex, Magnetic building blocks, Thistle blocks, etc.)
• Provide building patterns to follow

Precautions: General.
Sand Station

Individual/Partner
Alerting

Directions: Fill large container (i.e. baby pool or Rubbermaid tote) with sand and toys. Place hands in sand and search for objects or build sand castles.

Variations:
• Include water to provide different textures of wet/dry sand
• Use tools such as buckets, sifters, funnels, sand wheels, shovels, etc.
• Sand and water table may be purchased

Precautions: Refrain from exposure to mouth and eyes.
Play-Doh

Individual
Alerting

Directions: Place Play-Doh on a hard surface. Use hands to manipulate Play-Doh and create objects.

Variations:
• Use colored Play-Doh
• Use scented Play-Doh
• Provide building patterns to follow
• Objects to build include ideas such as animals, foods, houses, towers, flowers, holiday decorations, etc.
• Use tools such as silverware, plastic hammers, and clothes pins

Precautions: Refrain from placing Play-Doh in mouth, ears, and nose.
Floor Swimming

Individual
Alerting

Directions: Lie on floor and assume a swimming position. Move arms and legs as if swimming in the pool.

Variations:
• Create different strokes and give them fun names
• Swim on your stomach or back
• Lie on different textured floors (i.e. carpet, tile, floor mats, etc.)

Precautions: General.
Mellow Massage

Individual/Partner

Calming

Directions: Apply lotion to extremities. Use deep pressure and rub in different directions.

Variations:
• Use scented lotions or talc powder.
• Use long, short, or circular strokes.

Precautions: Avoid massaging on stomach, chest, neck, and face.
Motivating Massage

Individual/Partner
Alerting

Directions: Apply massage device to extremities and back. Use light pressure and rub in different directions.

Variations:
• Use different massage devices (i.e. vibrating massager, beanbags, cookie roller, paint roller, etc.)
• Roll self along the walls
• Have a partner operate the massage device

Precautions: Avoid massaging on stomach, chest, neck, and face.
Vestibular Activities

- The vestibular system is the most powerful of the three systems and its input lasts the longest.
- It tells an individual the position of the body and head in relation to the earth.
- The body responds to vestibular sensory information through balance, movement, motor planning, and posture.
- Activities may be alerting if they are performed in quick, sporadic, or irregular patterns.
- Activities may be calming if they are performed in slow, heavy, or rhythmical patterns.

Vestibular Activities

Scooter Board

Individual/Partner
Alerting/Calming

Directions: Sit or lay in center of scooter board.

Variations:
• Lay on stomach or back
• Peddle with hands or feet
• Form a train with others
• Get a ride from someone else or sit back and enjoy the ride
• Go backwards
• Travel over different surfaces, both hard and soft
• Compete in races with others

Precautions: Do not stand on scooter board. Do not run into walls or doors.
Sit-n-Spin

Individual/Partner
Alerting

Directions: Position body in center of Sit-n-Spin. Use upper body to propel self in circles or get a push and hang on.

Variations:
- Sit
- Kneel
- Lay down

Precautions: Use in open space. Do not spin longer than 20 seconds in one direction.
Rockin' Around

Individual
Calming

Directions: Sit in rocking chair. Push feet on the ground to rock self. Rock with increased speed for more input.

Variations:
- Vary the speed depending on the mood
- Provide a weighted blanket during rocking to increase the calming effects

Precautions: Keep feet in front of chair to prevent rocking over toes.
Scooterboard Hockey

Partner
Alerting

Directions: Lie down on a scooterboard with one's stomach on the scooterboard. Using a cardboard brick as the "hockey stick" hit a small ball (i.e. tennis ball) into the opponents goal area. Carpet tape or masking tape may be used to mark off boundaries.

Variations:
• Play scooterboard hockey with a group of children
• See how many times two players can hit the ball back and forth to each other

Precautions: Instruct players on safety and speed of hitting the ball to ensure the well-being of each player.
Swing Bowling

Individual
Alerting/Calming

Directions: Set up lightweight objects such as cones in the shape of bowling pins. Lay on stomach in a suspended hammock swing and swing forward, backward, and side-to-side while throwing beanbags to try and knock down cones.

Variations:
• Set cones up in a line
• Set cones up in a circle
• Stack cones
• Provide a variety of beanbags with different weight increments

Precautions: Assure child has adequate balance to perform activity.
Circular Balance Boards

Individual/Partner
Alerting

Directions: Stand with each foot on the outside edge of the balance board. Maintain balance while moving the ball through the maze within the center of the balance board.

Variations:
• Sit on floor, using elbows or hands to move ball through maze
• Use boards with a variety of designs and patterns

Precautions: Reduce risk of falls by performing activity by wall or hand-rail.
Two In A Ring

Partner
Alerting

Directions: Get into one hoop with a partner. Move about the room through an obstacle course or around furniture.

Variations:
• Try hopping, skipping, jumping, or going backwards
• Place an object between knees while walking
• Try bouncing a ball at the same time as walking

Precautions: General.
Proprioceptive Activities

• These activities unconsciously tell an individual about their body position in relation to others and objects in the environment.

• The proprioceptive system is activated when contraction, stretching, bending, straightening, pulling and compression of a joint or muscle occurs.

• Activities may be alerting if they are performed in quick, sporadic, or irregular patterns.

• Activities may be calming if they are performed in slow, heavy, rhythmical patterns.

Team Walker

Individual/Partner
Alerting/Calming

Directions: Place one foot on each walking board. Fasten strap to secure foot placement. Grasp the rope for the right foot with the right hand. Grasp the rope for the left foot with the left hand. Lift foot and pull rope on the same side with each step, alternating movements to move forward.

Variations:
• Connect pieces to walk in a group, one child behind the other
• Walk/Run
• March
• Jump
• Hop
• Spin
• Change directions
• Go backwards

Precautions: Make sure all ropes are securely attached before and after activity. It is important to assure foot straps are securely fastened.
Push-ups

Individual
Alerting/Calming

Directions: Brace arms against stable surface. Use upper body strength to bend at the elbows and push self up to starting position where arms are braced against a stable surface.

Variations:
- On the floor, on toes and palms
- On the floor, on knees and palms
- Against a wall with feet on floor in a standing position
- Against the edge of a table with feet on floor in a standing position
- Seated in a chair with armrests, place hands on armrests and elevate self using upper body strength

Precautions: Make sure surface is stable.
Push-of-War

Partner/Group
Calming

Directions: Sit on floor with knees bent and backs facing each other. Place one pillow between each pair of partners. Use back to push against the pillow. Push for 20 seconds, rest for 10 seconds, reset postures, repeat.

Variations:
• Try standing up while pushing against one another without using hands
• Replace the pillow with a ball
• Try with a group of 3 people, using 3 pillows

Precautions: Try pairing people of similar size.
**Paperlicious**

Individual
Alerting

**Directions:** Using scrap paper or recycled paper, rip paper into strips. Crumple papers into small balls and toss into nearby garbage can/recycle bin.

**Variations:**
- Rip 2 or 3 pieces of paper at the same time
- How many pieces of paper can be ripped at once?
- Attach a basketball hoop to the garbage can

**Precautions:** Papercuts.
Animal Walks

Individual
Alerting/Calming

Directions: Choose and act out the animal with slow or fast movement.

Variations:
• Bear
• Bird
• Bunny
• Crab
• Duck
• Elephant
• Inch worm
• Horse galloping
• Kangaroo
• Monkey
• Mule kick
• Rooster
• Seal

Precautions: General.
Melt the Ice

Individual
Calming

Directions: Sit on floor with knees bent, holding knees close to chest. Hug knees tightly, like an ice cube. Very slowly relax each part of the body, melting into a big puddle on the floor.

Variations:
• Be a blooming flower, instead of an ice cube
• Lay on a soft, hard, or textured surface
• Play calming music during activity

Precautions: General.
Tug of War

Partner/Group
Alerting/Calming

Directions: Divide into two equal teams. In a standing position, each team holds onto the rope at opposite ends and pulls the rope toward his or her side.

Variations:
• Play tug of war in the grass
• Use different “ropes” (i.e. bed sheets, silk rope)

Precautions: Divide teams equally in relation to height, weight, and strength. Make sure rope is in a secure location before and after activity.
Hop Scotch

Individual/Partner/Group
Alerting

Directions: Create a hop-scotch design with carpet tape. Hop on one foot when there is one square and hop with one foot into each box when there are two blocks placed next to each other.

Variations:
• Create any type of hop scotch design (i.e. 1, 2, 2, 1, 1, 2, 1)
• Use hula hoops instead of carpet tape to create hop scotch squares
• Use sidewalk chalk to create hop scotch squares on cement surface

Precautions: General.
Proprioception Activities

Skip-It

Individual/Partner
Alerting

Directions: Place one foot into small plastic hoop of the Skip-It. Spin the Skip-It in a 360 degree circular motion while continuously jumping over the Skip-It with the opposite foot.

Variations:
• Time self
• With partner, see who can Skip-It the longest

Precautions: Assure there is a large space to use Skip-It to prevent any collisions.
Balloonercise

Individual/Partner/Group
Alerting/Calming

Directions: Insert strips of paper into the balloons with different exercises written on them prior to inflation. Inflate the balloons and place them all in one area. Grab a balloon, pop it, and complete the exercise described on the paper.

Variations:
• Hop on right or left foot
• Sommersaults
• Jumping Jacks
• Push-ups
• Sit-ups
• Rolling
• Jumping

Precautions: Dispose of all balloon pieces.
Balloon Stomp

Partner/Group
Alerting

Directions: Tie a balloon to your ankle using a 2-foot string. Try popping an opponent’s balloon by stomping on it. Keep the left foot on the ground while the right foot is used to stomp, or vice versa.

Variations:
• Use small or large balloons
• Restrict movement to hopping only

Precautions: Be careful to only stomp on balloons, not an opponent’s feet.
**Proprioception Activities**

**Down, Down, Down Game**

Partner/Group
Alerting/Calming

**Directions:** Toss a tennis ball continually back and forth until somebody drops the ball. When the ball is dropped, go down on one knee. If the same person drops the ball again, go down on two knees. If the same person drops the ball a third time, go down on one elbow. If again, go down on two elbows. If the ball is dropped one more time, the person is out.

**Variations:**
- Eliminate the use of other body parts
- Use balls of different sizes and textures
- Speed up the game so there is only one or two seconds to return the ball to the other player

**Precautions:** General.
Proprioception Activities

The Airplane

Individual/Partner
Calming

Directions: Lie on stomach with legs together and straight. Position arms like “airplane wings”. Raise head, chest, arms, hips, and knees up at the same time. Keep legs straight and look straight ahead. When tired, softly release and bring legs, hips, chest, and head to the ground.

Variations:

• Make airplane noises while in the position of an airplane
• Time self with partner to see who can stay in the position of an airplane the longest
• While holding airplane position, shift weight to the left and right to simulate the positions of an airplane turning in the air

Precautions: Remember to breathe while holding the position of an airplane.
Seat Walk

Individual
Alerting

Directions: Sit on floor with legs and arms extended straight. Lift up one side of your bottom by tilting to the side and pushing forward. Shift and do the same on the other side of your body. Continue to scoot forward.

Variations:
• Race a partner
• Scoot by using your bottom as well as your hands

Precautions: General.
Balloon Volley

Partner/Group
Alerting

Directions: Using both hands try to keep a balloon up in the air as long as possible with a partner without letting the balloon touch the ground.

Variations:
• Only use one hand to keep balloon up in the air
• Use other body parts (i.e. head, knees, elbows, etc.) to keep the balloon up in the air
• Use a foam or beach ball instead of a balloon

Precautions: General.
**Crab-Walk Soccer**

Partner/Group

Alerting

Directions: Assume the position of a “crab-walk”. Using only feet, try to hit a ball into an opponent’s goal.

Variations:

- Use different textured balls (i.e. beach ball, foam ball, plastic ball, playground ball, etc.)
- Use other body parts (i.e. knees, hips, elbows, etc.) to hit the ball
- Hit ball without shoes on (keep socks on)
- Play crab-walk soccer on different textured surfaces (i.e. mats, carpet, ribbed mats, grass, etc.)
- Use boxes, tape, or chalk lines as goal areas

Precautions: Play crab-walk soccer in a large area to decrease risk of running into objects or each other.
Foot Toss

Partner/Group
Alerting/Calming

Directions: Sit in a circle with a group of children or with a partner. Carpet tape may be used to create boundaries for the circle. Using only feet, kick the ball back and forth to each other while trying to keep the ball within the boundaries.

Variations:
• Instead of kicking the ball back and forth with feet, use other body parts (i.e. hands, elbows, knees, etc.)
• Assume the position of a crab-walk while kicking the ball

Precautions: General.
Suspension Ball

Individual/Partner

Alerting

Directions: Suspend a ball from the ceiling to chest height of participants. Using a rectangular-shaped piece of cardboard, swing the ball to hit objects on the wall (i.e. stickers, shapes, letters, symbols, numerals, etc.).

Variations:

• Use rolling pin, wrapping paper roll, or other objects instead of a rectangular piece of cardboard as the "bat"

• Use different shapes and sizes of ball to suspend from the ceiling

• Position objects in a pattern to be hit (i.e. 1. letter, 2. number, 3. letter, etc.)

• Use one or both hands to hit the ball

Precautions: Suspend soft objects from the ceiling.
Animal Walk Bowling

Partner/Group
Alerting/Calming

Directions: Set up plastic bowling pins and create start and throwing lines with the use of carpet tape. Participants line up one at a time. Each participant assumes an animal walk position. The participant “animal walks” to the throw line, throws a bean bag at the pins and animal walks back to the line. Another participant sets up the pins for the next participant.

Variations:
• Animal walk forward, backward, sideways, etc.
• Use balls of different textures and sizes instead of beanbags
• Use different sizes and shapes of objects (i.e. cones) instead of plastic bowling pins

Precautions: General.
Proprioception Activities

Hand Jives

Individual/Partner
Alerting

Directions: Complete a hand jive by repeating one or more steps of a hand jive pattern (i.e. clap hands together, clap partner’s hands, slap own thighs). Music may be played or participants may sing a rhyme along with the hand jive pattern.

Variations:

• Assume different positions (i.e. stand, sit, kneel, etc.) while completing hand jive patterns
• Speed up or slow down hand jive patterns and/or rhymes

Precautions: Match participants’ abilities to hand jive pattern complexity to ensure success.
Rub Art

Individual/Partner
Alerting/Calming

Directions: Gather objects such as leaves, paper clips, strings, rubber bands, confetti, etc. Place paper over an object and rub the flat side of a crayon over the paper until the impression of the object appears on the paper.

Variations:
- Use pencils and chalk instead of crayons
- Integrate activity into number, letter, or math problem activities

Precautions: General.
Stamp Art

Individual/Partner/Group
Calming

Directions: Use stamp to make a design on a piece of paper.

Variations:
• Use different types of stamps (i.e. halved fruit and vegetables, sponges, body parts, blocks of wood, eraser tips, etc.)
• Use a variety of sizes and types of paper
• Use cloth sheets instead of paper
• Use paint instead of ink to stamp

Precautions: Assure all participants are not allergic to paints or inks used for stamping. Use non-toxic products.
Criss Cross Will Make You Jump, Jump!

Individual/Partner
Alerting/Calming

Directions: Stretch out a jump rope to make a straight line. Start at one end and jump up and down while moving from one end of the rope to the other end of the rope. Jump in a diagonal pattern.

Variations:
• Use tape, numbers, etc. instead of a jump rope to make a line
• Jump sideways instead of forward and backward
• Race to see who can get from one end of the rope to the other end of the rope the fastest
• Jump to the beat of music

Precautions: Assure the jump rope is accounted for at the end of the activity.
Air Cushion

Individual/Partner
Alerting/Calming

Directions: Place air cushion on hard surface. In a standing position, place feet on cushion. Try shifting weight in different directions.

Variations:
- Place hands, elbows, knees, or bottom on the air cushion
- Jump on cushion
- Jump on cushion with partner
- Place cushion on carpet or grass

Precautions: General.
Mummy

Partner
Alerting/Calming

Directions: Using toilet paper, wrap partner tightly from shoulders to toes.

Variations:
• Use cloth material to wrap partner

Precautions: If using durable materials, do NOT wrap too tightly.
Vestibular & Proprioceptive Activities

Carpet Slides

Individual
Alerting

Directions: Place strap over shoes and fasten. Use toe grips on bottom of slide for gaining speed. Shift weight to heels for sliding across the carpet.

Variations:
• Race a partner
• Go up and down carpeted ramps
• Replace Carpet Slide with plastic bags over feet or step in shoe boxes

Precautions: Only to be used on carpeted surfaces.
Steam Roller

Individual
Alerting/Calming

Directions: Crawl through or between the sets of rollers like being wrung through a clothes wringer.

Variations:
- Pressure exerted can be varied by adjusting the tension on the springs
- Go backwards

Precautions: Keep hair and loose articles of clothing under close supervision. Remove glasses.
Mini Trampoline

Individual
Alerting

Directions: Step onto the center of the trampoline and start jumping.

Variations:
• Try jumping combinations: feet—knees—feet—bottom....
• Can your knees touch your chest? Can your hands touch your feet behind your back? Can you do the splits in the air? Can you spin your body completely around while in the air?
• Play catch with a partner or with yourself while jumping

Precautions: Jump on feet, knees, or bottom only.
Spring Board

Individual
Alerting

Directions: Step onto the center of the springboard and start jumping.

Variations:
- Can your knees touch your chest? Can your hands touch your feet behind your back? Can you do the splits in the air? Can you spin your body completely around while in the air?
- Play catch with a partner or with yourself while jumping

Precautions: Jump on feet only. Wear shoes or non-slip socks.
Spring Balls

Individual
Alerting

Directions: Grasp the handle. Place the ball between your legs. Bounce, bounce, bounce.

Variations:
• Hop in place or scoot along

Precautions: Be sure to stay centered and in contact with the ball.
Vestibular & Proprioceptive Activities

Crash Pit

Individual/Partner
Alerting/Calming

Directions: Pile several pillows in a secure area. Jump into crash pit.

Variations:
• Use cushions, blankets, or other soft objects instead of pillows
• Sandwich your body in the middle to provide deep touch
• Jump and twist at the same time
• Jump in backwards

Precautions: No flips or somersaults. No diving head first.
Air Kicks

Individual
Alerting

Directions: Strap on your Air Kicks over shoes and start bouncing in place, then start bouncing around.

Variations:
• Walk/run a short race
• Jumping jacks
• Skip/leap

Precautions: Use wall for support until comfortable with activity.
Balance Beam

Individual
Alerting

Directions: Layout a balance beam design. Start with walking and see if you can try other movements (i.e. heel-to-toe walking, tippy-toe walking, and hopping).

Variations:
• Vary the layout of the four beams and vary the challenge

Precautions: Wear shoes to prevent slipping.
Body Sox

Individual
Alerting/Calming

Directions: Remove shoes. Hold the Body Sox vertically, with opening facing forward. Step into it, place each foot in a corner. Pull the Body Sox up and overhead, positioning head in the top center. Place hands/arms in upper corners.

Variations:
• Move over, under, around, through, on, off, up, down, in and out, exploring the three dimensional space your body occupies
• Create unique, dancing, art-like shapes with your body
• Be a rolling rock, sculpture, or animal

Precautions: Be aware of the surrounding space and any obstacles before moving about while inside the Body Sox.
Vestibular & Proprioceptive Activities

Power Pull

Partner

Alerting

Directions: Place self on blanket. Have one child pull his or her partner over rough or bumpy surfaces.

Variations:
• Use a towel or bedsheets
• With caution, pull partner by the ankles
• Sit, lie down, or kneel on the blanket
• Go forwards or backwards
• Pull through an obstacle course
• Make it a race against another team

Precautions: Provide a clear course to follow.
Wheelbarrow Walk

Partner/Group
Alering/Calming

Directions: The first person is on his or her hands and knees. The second person takes hold of the first person’s ankles. The first person keeps his or her arms straight with legs extended in the air while walking with hands.

Variations:
• Race another set of partners
• Wheelbarrow walk through a maze or obstacle

Precautions: First person should make sure he or she is able to keep arms extended to decrease the risk of forearms collapsing and falling.
Vestibular & Proprioceptive Activities

Potato Relay

Individual
Calming/Alerting

Directions: Lay on your stomach with arms at your side and legs extended. Place a potato in front of your nose. Push the potato with nose and chin while continuing to move forward.

Variations:

• Race a partner or group of people to see who can get the potato from one end of the room to the other end of the room
• Use other objects instead of the potato (i.e. orange, ball, etc.)

Precautions: General
Appendices
SI Group Session Outline

Title: Daily SI Exercise Group

Format:
- Introduction
- Activity
- Discussion
- Summary

Supplies:
- Proprioceptive tools
- Tactile tools
- Vestibular tools

Group Goals:
- Receive sensory input for all senses
- Regulate arousal level
- Have fun!

Introduction:
1. Introduce the session plans
2. Purpose: To complete a fun activity involving exercise and sensory stimulation
3. Expectations of the group
   a. Everybody participates at his or her level
   b. Use appropriate social interactions

Activity: SI Stations
• Explain the rules
• Divide into stations
• Participate

**Follow-up:**

• Processing:
  • Identifying feelings throughout the activity.
  • How did this activity make you feel?
  • How did your feelings change throughout the activity?
  • How did hearing others’ comments make you feel?

• Generalizing:
  • What responses does the group have to the activity?
  • What helped the group cooperate together?
  • What made the stations run smoothly?
  • Identify similarities between one another as well as differences.

• Application
  • How can our discussion today benefit you in other activities in the future?
  • How do compliments from others affect your self-esteem?

**Summary:**

• Restate purpose and goals of group session.
• Thank members for willingness to share with the group.
Glossary of Terms

- Adaptive behavior: A kind of behavior that allows an individual to substitute an unconstructive or disruptive behavior, to something more constructive.
- Auditory sensation: The sensation of hearing.
- Body awareness: Knowledge of where one's body is in space.
- Central Nervous System (CNS): The CNS is a system devoted to information processing, where an appropriate motor output is a response to a sensory input.
- Client-centered approach: Collaborative partnership between the therapist and the client used to demonstrate respect for clients, involve clients in decision making, advocate for clients’ needs, and recognize clients’ experience and knowledge.
- Gustatory sensation: The sensation of taste.
- Hyper-responsive: Also known as hyper-sensitive. Registration more intensely than normal; the individual is overaroused by sensations.
- Hypo-responsive: Also known as hypo-sensitive. Registration of sensation less intensely than normal; the individual is not receiving enough sensory information.
- Maladaptive behavior: A behavior or trait that is not adaptive—it is counterproductive to the individual.
- Motor planning: The process of deciding what your body has to do and then doing it. The process of conceiving, planning, sequencing, and executing actions.
- Modulation: The brain’s regulation of its own activity. Modulation involves facilitating some neural messages to produce more of a
perception or response, and inhibiting other messages to reduce excess or extraneous activity.

- Olfactory sensation: The sensation of smell.

- Optimal arousal level: The level when an individual is alert, attentive, and can easily concentrate.

- Pervasive Developmental Disorder (PDD): This refers to a group of five disorders characterized by delays in the development of multiple basic functions, including socialization and communication.

- Proprioceptive system: Sensory information telling us about our own movement or body position. It provides input that helps integrate touch and movement sensations.

- Self-regulation: The nervous system’s ability to attain, maintain, and change levels of arousal and alertness.

- Sensory diet: A planned and scheduled activity program designed to meet an individual’s specific needs.

- Sensory Integration Theory: A theory describing how the brain processes sensation and the resulting motor, behavior, emotion, and attention responses.

- Sensory Integration (SI): The ability to take in sensory information from one’s body and from the environment, to organize this information, and to use it to function in daily life.

- Sensory Integration assessment: The process of evaluating individuals with problems in processing sensation.

- Sensory Integration coordinators: Individuals who will implement the “Can You Regulate?” program. These individuals may include therapists, teachers, and/or other trained staff.

- Sensory Integration dysfunction: The inefficient processing of information from the tactile, vestibular, and/or proprioceptive
senses. The person may also have difficulty with other basic senses.

- Sensory Integration treatment: A method of intervention.
- Sensory seeking: Individuals who crave an unusual amount or type of sensory input and seem to have an insatiable need for certain types of stimulation.
- Tactile system: Pertaining to the sense of touch on the skin. It defines our body’s boundaries and differentiates light from pressure touch sensations.
- Vestibular system: This system tells us where our heads and bodies are in relation to the surface of the earth. It tells us whether we are moving, or standing still, and whether objects are moving or motionless in relation to our body.
- Visual sensation: The sensation of sight.
- Wilbarger protocol: A specific, professionally guided, treatment regime designed to reduce sensory defensiveness; involves deep-touch pressure throughout the day.

Adapted from (Ayres, 1979; Canadian Association of Occupational Therapists, 1997; Kranowitz, 1998; Miller, Anzalone, Lane, Cermak, & Osten, 2007; Williams & Shellenberger, 2001; Wikipedia, 2007a; Wikipedia, 2007b; & Yack et al., 2004).
Resources

Abilitations

• A company that provides products to improve the lives of children with differing abilities.
  • Website: www.abilitations.com
  • Phone: 1-800-850-8602
  • Fax: 1-800-845-1535
  • Email: customer.service@sportime.com
  • Address: P.O. BOX 922668, Norcross, GA 30010-2668

American Occupational Therapy Association (AOTA)

• A nationally recognized professional association of occupational therapists, occupational therapy assistants, and students of occupational therapy.
  • Provides information about occupational therapy services to individuals of all ages and abilities.
  • Website: www.aota.org
  • Phone: 301-652-2682
  • Fax: 301-652-7711
  • Email: helpdesk@aota.org
  • Address: 4720 Montgomery Lane, PO Box 31220, Bethesda, MD 20824-1220

Pocket Full of Therapy: Select Pediatric and School Based Products

• Occupational therapist owned and operated company specializing in products for pediatrics and developmental disabilities.
  • Website: www.pfot.com
Phone: 1-800-PFOT-124 or 732-441-0404
Fax: 732-441-1422
Email: pfot@pfot.com
Address: P.O. Box 174, Morganville, NJ 07751

Sensory Integration International: The Ayres Clinic
A website to inform individuals about sensory integration.
Website: http://www.sensoryint.com
Phone: 310-787-8805
Fax: 310-787-8047
Email: info@sensoryint.com

Theragifts
Sensory regulation toys and products.
A therapist owned and operated company specializing in therapeutic toys, products, and gift packages for individuals of all ability levels.
Website: www.theragifts.com
Phone: 603-437-3330
Fax: 603-437-0431
Email: info@theragifts.com
Address: 1F Commons Drive, Suite 38, Londonderry, NH 03053
References


CHAPTER V

SUMMARY

After completing an extensive review of literature the information indicated positive, negative, and inconclusive findings for the use of SI treatment. However, SI treatment was found to be beneficial for specific populations in improving behaviors in psychosocial and educational settings. Therefore, the purpose of the scholarly project was to develop a SI program that can be easily implemented in a psychosocial or school setting which will assist children in learning how to self-regulate.

Through incorporation of the OA theory, children may achieve self-regulation while engaging in the process of change, rather than solely listening and following directions from others. The OA theory was chosen because it enables the child to reflect on his or her behaviors, roles, occupations within the roles, the environment which supports the occupations, and those aspects of his or her roles. By learning how to reflect and self-regulate, the child will develop insight to what changes he or she should make and therefore lead to relative mastery (Schkade & Schultz, 2003). Thus, the OA theory was used to guide the authors in the development of the “Can You Regulate?” program manual.

The manual is divided into sections and provides an introduction to the SI program and SI treatment tools to be used in the “Can You Regulate?” program. Specific SI tools include activities that focus on three sensory systems: proprioception, tactile, and vestibular. It is the authors’ intent that occupational therapists and other health and
educational professionals with training and a background in SI theory and intervention coordinate the program. It is also intended that this program will educate children on how to self-regulate, communicate with staff members, and become his or her own agent of change in the areas of: arousal level, attention span, engagement, adaptive behaviors, anger management, and academics.

The "Can You Regulate?" program is viewed as a flexible program which can be easily implemented by a variety of professionals under the supervision of a SI trained program coordinator. Any child can benefit from participating in this program, whether or not the child presents a sensory dysfunction. Not only do the children receive the benefits of the program, but the family members, professionals, and peers involved in the child's life benefit as well.

There are also limitations to the "Can You Regulate?" program. As stated above, the literature in SI has been found to be inconclusive. This program has been developed, but not yet implemented into current clinical practice. All facilities may or may not have occupational therapists employed to carry out this program, so other staff members who may not have a background in SI will be responsible for implementing the "Can You Regulate?" program. A training program and competency checklist have not yet been developed to ensure all professionals are capable in carrying out the program.

Some recommendations can be made for this scholarly project and the implementation of the "Can You Regulate?" program. The development of a training program and a competency checklist for professionals who are potential coordinators for the program would be beneficial. This would ensure competency of understanding SI
theory and SI intervention, understanding how SI affects behavior and academics, and how to implement the “Can You Regulate?” program.

As occupational therapists in the psychosocial and educational settings, it is important to educate and communicate with other professionals on the treatment team to define our scope of practice for children with sensory needs. This will help guide the treatment team in further understanding occupational therapy and the SI services that may be provided to the child.

It is also recommended the sensory activities in the “Can You Regulate?” program manual be modified to be utilized for adults. SI therapy has been proven in the literature to be beneficial for adults as well as children. As a result, the authors suggest further research be completed in the areas of SI and adults, sensory activities specifically for adults, and the benefits of SI with adults in a variety of settings.
APPENDICES
Appendix A

Assessments
**SCSIT**

The purpose of the SCSIT is to assess perceptual motor skills and help identify SI dysfunction in children. Sub-tests include: position in space, design copying, kinaesthesia, double tactile stimuli perception, manual form perception, finger identification, graphesthesia, localization of tactile stimuli, imitation of posture motor accuracy, and right-left discrimination (Brainworks, Inc., 2005).

**SCPNT**

The SCPNT is used to measure the duration of nystagmus (involuntary movements of the eye ball), to assist in. This is assessed by a child sitting on a turn table, rotating, then stopping and measuring the duration of the nystagmus effect with a stopwatch (Montgomery, 1985).

**SIPT**

The SIPT evaluates various areas of a child’s sensory systems, as well as assists in identifying learning and behavior disorders. It includes the following subtests: space visualization, figure-ground perception, standing and walking balance, design coping, postural praxis, bilateral motor coordination, praxis on verbal command, constructional praxis, postrotary nystagmus, motor accuracy, sequencing praxis, oral praxis, manual form perception, kinaesthesia, finger identification, graphesthesia, and localization of tactile stimuli (Ayres, 1991).
Appendix B

Sensory Diet
Case Scenario:
A six year old female diagnosed with ADHD, is hyperactive and demonstrates few verbal language skills. A sensory profile was completed and the results indicated she has sensory defensiveness to touch and sound. She attends therapy groups for three to four hours per day.

Recommendations for a sensory diet:

Morning Warm ups:

<table>
<thead>
<tr>
<th>Jumping Jacks</th>
<th>Running in place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall push-ups</td>
<td>Leap frog</td>
</tr>
<tr>
<td>Wheel barrel walking with a partner</td>
<td>Foot to foot bicycling with a partner</td>
</tr>
</tbody>
</table>

Throughout the day:

<table>
<thead>
<tr>
<th>Access to dry play materials such as: sand, salt, rice and beans</th>
</tr>
</thead>
<tbody>
<tr>
<td>“High fives” throughout the day</td>
</tr>
<tr>
<td>Hand fidgets stress balls, ther-a-putty, Play-Doh, small squeeze balls</td>
</tr>
<tr>
<td>Assigned “spot” to sit for circle time (make sure each child has his/her own space)</td>
</tr>
<tr>
<td>Alternative seating position- kneeling, lying on tummy and elbows, beanbag chair, padded cushion on chairs</td>
</tr>
<tr>
<td>Implement a variety of genres of music (classical, Disney, nature sounds) while closely monitoring the volume and duration of the music.</td>
</tr>
<tr>
<td>Provide quiet time and places for the child (tent, place outside of the room).</td>
</tr>
</tbody>
</table>

During outdoor activities encourage child to play on the:

<table>
<thead>
<tr>
<th>Monkey bars</th>
<th>Jungle gym climber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teeter-totter</td>
<td>Kickball</td>
</tr>
<tr>
<td>Jump rope</td>
<td>Sandbox</td>
</tr>
</tbody>
</table>

Calming activities:

<table>
<thead>
<tr>
<th>Quiet music</th>
<th>Reading time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing exercises</td>
<td>Fidget toys</td>
</tr>
<tr>
<td>Wrap child in weighted blanket</td>
<td>Allow time to play with soft textured toys (Beanie Babies, cotton balls, fleece pillow)</td>
</tr>
</tbody>
</table>

Adapted from: (Kranowitz, 1998; Yack, et al., 2002)
REFERENCES


