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# Survey of Sensory Diet Use Among California Occupational Therapy Practitioners

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# Survey of Sensory Diet Use Among California Occupational Therapy Practitioners

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## Abstract

The purpose of this study was to examine the use of sensory diets in the field of occupational therapy. This study investigated the use of sensory diets among California occupational therapy practitioners. A mixed-methods design was used to collect data through an online survey. The survey was sent out to members of the Occupational Therapy Association of California (OTAC) and received 98 respondents within one month. Participants worked among various clinical settings and implemented sensory diets with various client populations. Practitioners reported using terms such as “sensory strategies,” “sensory tools,” and “sensory supports” which indicates an overall misunderstanding associated with the term “sensory diet.” An alternative name that is more easily understandable and used universally would help decrease confusion among clinicians and clients. Further research is needed to better understand the effectiveness of sensory diets and how they are implemented.

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## Introduction

Sensory diets are a common intervention in the field of occupational therapy (OT). First described by Patricia Wilbarger, the "sensory diet" is used as an intervention to provide sensory based strategies throughout an individual's day to facilitate an optimal level of arousal, promote typical development and improve occupational performance in the context of daily life (Wan Yunus, Liu, Bissett, & Penkala, 2015; Wilbarger, 1995). A sensory diet is not a mass-produced protocol. Sensory diets are thoughtfully created, client-centered daily routines developed to meet the needs of an individual consumer (Wilbarger, 1995). A sensory diet is an extension of therapeutic intervention with an OT that can be used in everyday life (Wilbarger & Wilbarger, 2002). In pediatric OT practice, sensory diets are common; however, many populations, such as, seniors or those with psychosocial challenges, also benefit from sensory diet strategies (Baltazar Mori, 2015). Wilbarger did not intend for sensory diets to be limited to pediatric OT (P. Wilbarger, personal communication, 2016).

A plethora of information about sensory diets can be easily accessed through an Internet search. However, clinical evidence supported by scientific research on the use of sensory diets is scarce. The lack of empirical evidence has led to inconsistent application of sensory diets. Additionally, there is a substantial gap in knowledge about the populations that may benefit from a sensory diet. The lack of consistent information on the application of sensory diets informs the research objective of this study to gain a greater understanding of how OTs use sensory diets in practice. A survey was sent to OT members of the Occupational Therapy Association of California (OTAC) asking how they define and apply sensory diets in practice.

## Literature Review

Occupational therapists create sensory diets to meet the needs of their clients throughout the day. These needs can range from maintaining an optimal arousal state to enriching development. Sensory diets are based on sensory integration theory (SI) developed by Dr. Jean Ayres and incorporate sensory-based activities. Each sensory diet is unique to the client's specific needs and can consist of a variety of components including: concepts from sensory integration therapy, sensory based interventions, exercise, or physical activity.

The goal of sensory integration therapy (SIT) is to help children adapt to their environments and increase independence in everyday activities by enhancing the ability to process and use sensory information. SIT is intended to be administered through participation in sensory rich activities that challenge children to adapt within a clinical setting (Parham et al., 2011). Sensory diets are set apart from SIT because they are not restricted to the clinic and can be used within various settings. Sensory diets also incorporate sensory-based interventions. Sensory-based interventions (SBI) aim to help clients self-regulate their impulses, emotions, and senses. SBIs have shown to decrease behavioral problems through vestibular, tactile, and proprioceptive-based interventions (Wan Yunus et al., 2015). Physical activity has been shown to increase attention and participation, while promoting positive affect.

While each of these topics has individual empirical research regarding their success with various populations, there is limited research on their success when specifically applied to creating sensory diets.

### History of Sensory Integration

Sensory integration therapy (SIT) created by Dr. A. Jean Ayres facilitates engagement in client-centered, sensory rich experiences. SIT is an area of OT that requires advanced post-

graduate training and is a highly skilled intervention. Evidence reveals that SIT is an effective intervention for sensory processing remediation in children with autism spectrum disorders (ASD) (Schaaf et al., 2014). The application of SIT requires core elements: opportunities for enhanced sensory experiences, just-right challenge, collaboration on activity choice, guidance for self-organization, support for optimal arousal, a playful context, maximization of child success, physical safety, room set-up to engage the child, and fostering of a therapeutic alliance (Parham, et al., pg. 219, 2011).

One of the goals of SIT focuses on either inhibiting or stimulating vestibular, proprioceptive or tactile sensation to help strengthen a child's independence in daily activities. Over time with SIT, the nervous system should adapt and allow children to process and react to stimulus in the environment more efficiently. This process attempts to facilitate a child's ability to integrate his or her senses to provide a necessary foundation for meaningful participation in occupation (Schaaf & Nightlinger, 2007). SIT and sensory diets share the goal of promoting a client's ability to self-regulate in order to increase participation in daily life. SIT focuses on the ability to process information from one's senses and functionally interact with the environment, resulting in what is known as an adaptive response. Adaptive responses lead to further integration of the senses in order to remediate one's sensory processing capacities (Ayres, 2005).

Sensory diets most commonly use sensory-based activities to address self-regulation. Sensory diets promote a level of alertness or calm that meets the environmental demands required to attain one's functional goals. One purpose of a sensory diet is to help an individual cope with a problematic environment by providing individualized sensory input to enhance a child's occupational performance (Wilbarger & Wilbarger, 2002). Sensory diets combine the

application of both SI theory and intervention and basic OT principles throughout daily life, not only within the clinic (Parham et. al., 2011).

**History of Sensory Diets**

Sensory diets were developed as an extension of the principles set forth by Ayres, however sensory diets do not incorporate all of the intervention principles of SIT (Parham et al., 2011). Patricia Wilbarger coined the term sensory diet in an attempt to explain complex neurobehavioral theories to parents and to other professions (Wilbarger P., 1995). By using a nutritional diet as a metaphor, Wilbarger explained that just as healthy meals need an array of different food choices to be nutritionally balanced, the correct combination of sensory input is necessary to have optimal occupational performance (Wilbarger P., 1995). Children and adults of all ages often use sensory input to optimize their function throughout the day without realizing it. For example, an employee may remain focused throughout a long meeting by bouncing their foot or chewing gum. In the field of OT, sensory diets are typically utilized to provide the client with a specially designed routine in response to his or her need for sensory stimulation. Sensory diets are unique to each person and should be prescribed based on assessment of sensory needs and goals to promote full participation in daily activities. While sensory diets are commonly used with children, Wilbarger did not intend for sensory diets to be used exclusively with children. People of all ages can benefit from a sensory diet (Wilbarger, 1995).

**Sensory Based Interventions**

Sensory-based interventions (SBI) are often used in sensory diets. SBIs involve enriched or specialized sensory input that is tailored to the child's needs to promote optimal arousal state and function. SBIs include a range of interventions that can be easily incorporated into a sensory diet. Sound-based therapies, environmental adaptations, hand fidgets, and other modalities are all

considered SBIs. In a sensory diet, for example, deep tactile pressure may be implied daily during a child's morning routine to promote optimal participation in occupations.

Individuals with behaviors including inattention or poor arousal, self-regulation problems such as tantrums, aggression, injurious behaviors, and restlessness have been observed to benefit from SBI (Wan Yunus et al., 2015). SBI may include any sensory modality such as, auditory, oral-motor/respiratory, tactile, proprioceptive, and/or vestibular approaches. Olson and Moulton (2004) conducted a study to identify behavioral changes that resulted from the use of weighted vests with children diagnosed with ADHD, ASD, and SPD. The study results indicated behavior changes in all the various developmental disorders, especially improvements in attention and staying on task were noted (Olson & Moulton, 2004).

**Tactile.** Tactile refers to the touch sensation felt when interacting with the environment and different objects. Different forms of tactile sensations could include a cold, hot, painful, soft, or vibration (Wan Yunus et al., 2015). In a systematic review, changes in overall behavioral patterns in children with attention deficit/hyperactivity disorder (ADHD) and autism spectrum disorders (ASD) improved through tactile based interventions many of which included massage therapy (Wan Yunus et al., 2015). Tactile stimulation was shown to be the most effective in reducing problematic behaviors (Wan Yunus et al., 2015).

**Auditory.** The auditory sense is the body's ability to collect, amplify and transduce sound waves into electrical impulses that allow the brain to hear and locate the sounds. Auditory interventions often include sound based therapies or environmental modifications such as noise canceling headphones. Hall and Case-Smith (2007) researched the effect of sound-based therapy on ten children with sensory processing disorders. Many of the children in the study also were diagnosed with ASD, ADHD, sensory processing disorder, and developmental delays. The first

four weeks of intervention consisted of a sensory diet, followed by an additional eight weeks of intervention comprised of a sensory diet alongside a Therapeutic Listening® program. The combination of a sound based therapy and a sensory diet led to improvement in attention, social interaction, transitions, self-awareness, and communication. Therapeutic Listening® was identified to improve participants' visual perception. Additionally, researchers noted that the use of a Therapeutic Listening® program helped prepare children for purposeful activities within their sensory diets (Hall & Case-Smith, 2007). Gee, Thompson, Pierce, Toupin, and Holst (2015) conducted a case-control study to determine the effective of the The Listening Program (TLP) on children ages 5-10, diagnosed with ASD and sensory processing difficulties who were experiencing behavioral challenges. After the 28-week study, the majority of participants showed an overall decrease in behavioral challenges. In turn each participant showed varying results, but TLP may prove to be a valuable intervention for individuals experiencing auditory over-responsivity.

**Proprioception.** Proprioception is the sense that provides one with the sense of body position in space. Proprioception processing refers to the input received by an individual's muscles and joints, allowing individuals to sense stimuli and transmit information to the brain regarding position, motion, and equilibrium of the body. This sense enables individuals to participate in various physical activities safely and skillfully. Through participation in physical activity, a person can become more aware of their body which leads to adaptive responses. Heavy physical work, such as hanging from the monkey bars or push-ups, increases proprioceptive sensation and helps an individual self-regulate to further participate in functional occupations (Watling & Dietz, 2007). In a study of the effects of gymnastics participation on typically developing individual's proprioception, it was found that the people who participated in

gymnastics had improved body awareness. The program incorporated physical activity such as jumping, running, and hanging from bars (Vuillerme, Teasdale, & Nougier, 2001). Environmental adaptations also help to regulate an individual's proprioceptive system such as weighted vests, sitting on therapy balls and other adaptive seating, and hand fidgets (Wan Yunus et al., 2015).

**Vestibular.** Vestibular sensation is felt when the body moves in any speed or direction, and is sensed through an organ in the inner ear. The vestibular system plays an important role in an individual's ability to participate in daily life as it directly affects balance and coordination (Wan Yunus et al., 2015). The inner ear contains fluid-filled canals and other structures that respond to movement such as change in direction, head position, and gravitational pull. The sense of movement within the inner ear results in postural and body movement changes. The vestibular system influences an individual's balance and equilibrium. A person with poor processing of vestibular information may have gravitational insecurity and aversive responses to movement. For example, some individuals who are hyper-responsive to vestibular stimulation may not be able to sit on a swing. Individuals who are hypo-responsive may crave spinning on swings for long periods of time. A person who has an underdeveloped vestibular system may present with poor coordination and/or balance (Watling & Dietz, 2007). Swinging is often used in a SBI or sensory diet to help the client reorganize him or herself. For example, when a client becomes overwhelmed slow rhythmic vestibular input can be a calming stimulus to help him or her return to their state of optimal arousal.

**Oral responsiveness and respiration.** The oral sense plays a role in chewing, tasting, swallowing, and even communicating. The mouth has the most tactile receptors in the human body and eating and speaking requires very complex motor control and proprioceptive feedback.

The way an individual is able to control their mouth when eating and communicating affects how they participate in mealtimes and various other occupations during the day. Oral over responsiveness in an individual may result in refusal to eat certain foods or textures leading to a restricted diet. In addition to mealtime, the daily occupation of teeth brushing may also be a problem (Kern et al., 2006).

Fucile, Gisel, McFarland, and Lau (2011) aimed to study the impact of oral, tactile/kinesthetic (T/K), or a combination of oral and T/K interventions on the oral feeding performance of preterm infants (n=75). Oral intervention included twice-daily stroking of cheeks, lips, gums, and tongues for twelve minutes and nutritive sucking for three minutes (Fucile, Gisel, McFarland, and Lau, pg. 830, 2011). T/K intervention included twice-daily stroking of the head, neck, back, arms and legs for five minutes, while the T/K and oral combination intervention included a random combined intervention protocol for fifteen minutes of either oral or T/K in a random order. Each of the three sensorimotor intervention groups showed improved oral motor performance when compared the control group who received no stimulation (Fucile, Gisel, McFarland, and Lau, pg. 834, 2011).

The M.O.R.E (motor components, oral organization, respiratory demands, and eye contact) program written by Patricia Oetter, Eileen Richter, and Sheila Frick (1995) focuses on the influence that the mouth has on the suck/swallow/breathe synchrony; which affects development, especially sensory and postural functioning. The program outlines treatment principles to incorporate major components of oral motor activity such as: sucking, blowing, biting, or crunching into meal and play activities. The program describes the uses of multiple whistles and oral toys. The activity demands of the whistles and toys are graded from the simplest to the most difficult and are broken down by motor components, oral organization,

respiratory demand, and eye contact/control.

Various sensory-based interventions are available for therapists to implement with different client populations. While some sensory interventions focus on specific sensory systems, physical activity is an option that allows people to be exposed to multiple sensations at once. Physical activities range from team sports to hiking and can be tailored to meet an individual's wants and needs within their daily routine.

**Physical Activity**

Physical activity often includes proprioceptive, auditory, vestibular, and tactile input within one activity. Various populations have shown substantial benefits of physical activity to regulate one's mood, behavior, and sensory processing (Petrus et al., 2008; Watling & Dietz, 2007; Bass, Duchowny, & Llabre, 2009). Physical activity is often a natural part of an individual's day or can be easily incorporated in a sensory diet for various populations.

**Benefits for typical population.** Lambourne, Audieffren, and Tomporowski (2010) examined the effects of acute exercise on sensory and executive processing tasks in typical developing young adults. Nineteen men and women (mean age 21.1 +/- 1.7) participated in 40 minutes of aerobic cycling. The participant's sensory sensitivity and executive processing performance was measured five times during the 40-minute exercise and 30-minute post exercise. Sensory sensitivity was measured with critical flicker fusion (CFF), and was chosen due to its index of central nervous activity. "CFF is a visual sensory-discrimination task that measures the point at which an individual perceives that a flickering light has become fused, and at the point which a fused light begins to flicker" (Lambourne, Audieffren, & Tomporowski, 2010, pg. 2). CFF allowed the researchers to test participant's sensory sensitivity before and after exercise. The paced auditory serial addition task (PASAT) was used to measure executive

functioning. There was a gradual improvement found in the participant's sensory sensitivity during exercise. Moderate steady-state exercise increases central nervous system arousal, allowing the nervous system to be more receptive to sensory information and increasing the speed of motor processes, as measured by the CFF and PASAT. The study also found that after exercise there was an increase in attention and filtration of sensory input.

**Benefits for mental health population.** The benefits of exercise also referred to as physical activity, have been well documented for clients with developmental and psychiatric disorders such a depression and schizophrenia spectrum disorders (SSD). A pilot program on physical activity and mental health clients determined that exercise improved depression as well as positive and negative symptoms for individuals with SDD (Beebe et al., 2013). Exercise is often seen paired with holistic therapeutic intervention by an occupational or physical therapist. In a systematic review, a decrease in atypical behaviors was found in every case immediately following exercise intervention, but out of the seven included studies, three saw lasting behavioral changes for two days. In addition, three studies examined academic performance, but no changes in academic performance were found (Petrus et al., 2008).

Benefits of enduring physical exercise have been found as a viable remediation for depression. A systematic review conducted by Sjösten & Kivelä (2006) determined that exercise is an effective non-pharmacological alternative for the treatment of depression in cross-sectional populations of adolescents and middle-aged adults. This correlation between high levels of physical activity and low levels of depression indicates that physical activity may be an effective sensory-based intervention.

**Benefits for individuals with ADHD or ASD.** Exercise's positive effects include reduced abnormal behaviors, particularly for adults with autism spectrum disorder (Watling &

Dietz, 2007). The benefits of exercise to increase attention span and retention rates in children with ADHD have also been documented. In one study, 20 children between the ages of eight and ten years old diagnosed with ADHD completed 20 minutes of exercise on a treadmill. The exercise group performed better on reading comprehension, arithmetic tests, and improved their regulatory processes when compared to sitting before the tests (Burke, 2013). Researchers concluded that many children with ADHD experience difficulties with the sedentary tasks of school and by providing him or her with an opportunity to release their energy through exercise, their behaviors improved (Burke, 2013).

Bass, Duchowny, & Llabre (2009) examined the effect of therapeutic horseback riding on social interaction and sensory processing. Nineteen participants diagnosed with ASD were included in experimental treatment, and the participants' results were compared to 12 individuals in the control group. Researchers hypothesized that the intervention would improve social functioning after 12 weeks. Therapeutic horseback riding is commonly used to improve posture, balance, and coordination while stimulating multiple functions for people suffering from motor, cognitive, and social challenges. The Social Responsiveness Scale (SRS) and the Sensory Profile (SP) were used for pre and post testing comparison. At the end of the intervention, scores were compared to the control group on the intervention waiting list. Overall, the researchers found that social interaction skills were improved. This is reported to be a result of the horse and rider interaction and the stimulus provided by the act of riding. The participants also demonstrated an improved level of sustained attention and focus during the therapeutic activity.

## Sensory Diets

**Sensory diet populations**. Sensory diets are applicable across the lifespan of a wide range of individuals to promote a healthy lifestyle and optimal functioning regardless of their age

or diagnosis. However, there is limited empirical evidence on non-clinical populations who use sensory diets to improve their daily life. Evidence supports that sensory diets are most often used with individuals diagnosed with autism spectrum disorders (ASD), attention deficit hyperactivity disorder (ADHD), and sensory processing disorders (SPD).

**ASD.** According to the American Psychiatric Association (APA), the DSM-V categorizes dysfunctions found in individuals diagnosed with ASD as social interaction impairments with an observable set of restricted interests and repetitive behaviors. According to Watling, Deitz, & White (2001), 30% to 100% of individuals with ASD have sensory-perceptual abnormalities. Children with ASD experiencing abnormal sensory and perceptual input can have a difficult time completing even the most basic tasks.

**ADHD.** Kuo and Andrea (2004) state that ADHD is the most common neurobehavioral disorder of childhood. Neurobehavioral disorders typically result in varied behaviors due to the irregularities in the nervous system. Studies have shown that participating in physical activity significantly reduces the negative symptoms of ADHD, such as disorganization, inattention, and/or impulsivity. For example, a two-group study was done where one group participated in outdoor activities and the other participated in indoor activities. Results were found using a pre and post questionnaire completed by the subject's parent or guardian. After the study was completed, the parents of the participants of the outdoor playgroup reported significantly lower hyperactivity and impulsivity levels compared to the indoor activity group (Kuo & Andrea, 2004).

Children diagnosed with sensory processing dysfunction often have a co-diagnosis of ADHD (Kumari Sahoo, & Senapati, 2014). Deficits in sensory integration can cause poor motor coordination, inattention and impulsive behaviors, therefore affecting a child's family, school,

social, and daily activities (Kumari Sahoo, & Senapati, 2014). The researchers conducted an experiment on two groups. Group A received a sensory diet and components of SIT, while group B only received components of SIT. Therapy was conducted outdoors, in order to facilitate concentration and impulse control often referred to as "green time." The overall functional behaviors, such as arousal level, self-organization and self-regulation, of the children with ADHD in group A improved and were reflected in family, school, social, and daily activities (Kumari Sahoo & Senapati, 2014).

**Sensory processing disorder.** Sensory processing disorder (SPD) occurs when the brain is unable to organize sensory input for appropriate use, often associated with learning, developmental, and emotional disabilities (Witt Mitchell, Moore, Roberts, Hachtel, & Brown, 2015). The variety of behaviors displayed in SPD result from the brain's inability to properly interpret stimuli resulting in under responsive or over responsive reactions (Wiit Mitchell et al., 2015). One study investigated the effectiveness of a two-week sensory diet program and parent education to reduce fussiness in infants with SPD. The sample included 12 infants ages 7-24 months with sleep disturbances, poor self-soothing habits, hyper-arousal, and feeding disorders. The Infant-Toddler Symptom Checklist was utilized to create a baseline for each infant before the intervention began. The two-week intervention included parent education and a sensory diet home program designed to address each infant's specific sensory and behavioral dysfunction. Examples of specific sensory and behavioral dysfunction include under-responsivity, over-responsivity, and postural deficits. After two weeks, the parents completed the Infant-Toddler Symptom Checklist again to compare the results to the original baseline (Witt Mitchell et al., 2015). The results found a significant decrease in fussy behavior, a 73% overall improvement within the group, and a significant improvement in self-regulation (Witt Mitchell et al., 2015).

**Mental health.** Sensory diets are implemented as interventions with the mental health population. Tina Champagne, a mental health occupational therapist, advocates for the use of sensory diet strategies as an alternative to seclusion and restraint practices in mental health settings (Champagne & Frederick, 2011). The common practice of restraint and isolation accounts for approximately 150 deaths per year and immeasurable injuries to staff and clients in US mental health settings (Champagne, 2015). Restraint and isolation practices are reduced by the utilization of sensory rooms as sanctioned by The National Association of State Mental Health Program Directors (Champagne & Frederick, 2011). Sensory rooms are quiet locations where calming strategies of a sensory diet minimize crisis escalation. Mental health advocates praise sensory diet approaches in promotion of self-control and self-regulation for individuals with mental health challenges (Baltazar Mori, 2015).

## Summary and Conclusions

In conclusion, Patricia Wilbarger created sensory diets to provide a unique sensory schedule to help each client to maintain their optimal arousal. Sensory diets are based on Ayres SI theory of providing sensory rich activities; however they take those experiences outside of the clinic into everyday life. While sensory diets were originally implemented in the neonatal intensive care unit, Patricia Wilbarger believed they could be as equally helpful for any population and within any setting (Wilbarger, 1995). There is considerable literature regarding the use of sensory diets within sensory integration and pediatric practice. However, there is a lack of awareness and understanding of how sensory diets are currently being used with different populations such as geriatric, mental health, and physical disability. This study aimed to fill that gap in knowledge by surveying OTs working with a variety of populations to better understand how they implement sensory diets in their settings.

The topic of sensory integration theory and sensory diets are adequately documented in current literature. However, a large gap of knowledge exists regarding the use of sensory diets in occupational therapy practices. Additionally, there is a considerable lack of evidence on the effectiveness of sensory diets and the populations that benefit from the intervention. Research studies that include sensory diets are typically focused on sensory integration and do not detail sensory diet benefits or their application. In this study, the aim is to gain a greater understanding of how occupational therapists are using sensory diets in daily practice.

## Statement of Purpose

Sensory diets are used by many occupational therapists (Kumari Sahoo & Senapati, 2014). Information regarding sensory diets is easily found on the Internet, however there is a lack of empirical evidence for the best practice within the profession of OT. Additionally, there is limited information about what populations are benefiting from the use of sensory diets. In the limited studies available, sensory diets incorporate various client specific, sensory-based components into a daily routine. Therefore, the purpose of this study is to help fill the gap in literature and to further examine the use of sensory diets in the field of occupational therapy. In an effort to facilitate the best practice in the field of OT, empirical evidence on the use of sensory diets is necessary to maintain evidence-based practice. A survey about the current use of sensory diets was sent to members of the OTAC. Each occupational therapist that completed the survey provided details regarding their decision to use sensory diets, who they believe would benefit from sensory diets, how they implement sensory diets, and the process of how they choose which pieces of the diet to recommend (i.e. heavy work, crunchy snack, sitting on exercise ball). Thus, the research questions are:

- Who uses sensory diets in treatment?

- With what populations are sensory diets being used?
- What are the modalities included in the implementation of sensory diets?

Specific objectives of this thesis included identification of client populations therapists have used sensory diets with, various modalities that therapists reported using, and raise awareness for the need of empirical evidence. Occupational therapists are required to use evidence based practice methods, therefore if the use of sensory diets is supported with significant evidence, therapists would be able to effectively use and recommend sensory diets. Additionally, sensory diets have been shown to be beneficial for clients with mental health concerns for crisis de-escalation and are a core strategy of the Trauma and Justice Initiative in the effort to reduce or eliminate isolation and restraint practices in mental health facilities. Sensory diets are suspected to be less individualized than initially intended by Patricia Wilbarger, and certain components emphasized more than others, such as the use of therapy balls and weighted vests (Wan Yunus et al., 2015).

## Theoretical Framework

Sensory integration theory guides the research on sensory diets. Ayres (2005) describes sensory integration as the neurological process of organizing sensation and interacting with the environment. For learning to occur, an individual must receive and process the sensation from movement and the environment and use the information to plan and organize behavior. The integration of sensation from the environment promotes successful occupational engagement. Dr. Jean Ayres developed sensory integration therapy as a way for OT practitioners to help facilitate sensory processing. Sensory processing includes the ability to organize, integrate, and understand information from the surrounding environment (Mauer, 1999). Sensory integration

therapy is guided by specific intervention principles, and sensory diets capture some of these key principles.

Sensory diets provide activities rich in sensation, while promoting regulation of alertness through different sensations as a client-centered practice. Sensory diets follow many key principles of sensory integration theory and incorporate sensory-based interventions. It is beneficial to focus on implementing sensory diets as a therapeutic intervention to help a client interact with their environment more successfully throughout their day. Sensory diets are intended to help clients organize their responses to sensory stimuli in daily life and therefore, successfully engage in meaningful and necessary occupations. When clients are unable to respond appropriately and process their sensory stimuli, their lives are dramatically affected. Sensory diets strive to provide an additional technique for therapists to employ with clients who struggle with organizing sensory stimuli.

## Ethical and Legal Considerations

To maintain the utmost trustworthiness and promote just ethical conduct, the following principles of the AOTA Code of Ethics were considered. Beneficence ensured the safety and well-being of the participants. Nonmaleficence affirmed that the participants would not be harmed in any way from the study. The researchers designed a survey that collected only necessary and relevant information to the research topic. Autonomy and confidentiality ensured that the participants gave consent and voluntarily participated in the study. The participants' identities were also protected by the use of a survey that obtains high levels of anonymity. Lastly, veracity ensured that the communication throughout the study provided participants with truthful and accurate information about the research study and the profession of occupational therapy (AOTA).

An application was submitted and approved by the Dominican University of California Institutional Review Board for the Protection of Human Subjects (IRBPHS #10529). The plan intended to avoid harm to the participants or any person involved in the study. Participation in the survey was completely voluntary and participants were allowed to withdraw from the survey at any time. All identities remained confidential. Participation and/or decision not to participate in no way affected participants' professional standing at work or reputation within the OTAC.

## Methodology

### Design

This descriptive study used a mixed methods design with a quantitative and qualitative survey to gain insight and understanding into the common practices of sensory diets utilized within occupational therapy. A structured survey was electronically delivered to licensed occupational therapists that are members of the OTAC. A broad perspective of analysis was applied to all collected data to discover common themes in practice, clinical anomalies, and reported accounts of client outcomes with sensory diets. An intensive focus examined the complex and dynamic nature of sensory diets as reported by participants to compile information in attempt to benefit the profession of occupational therapy.

### Participants

The target population for this study was employed occupational therapists working with a variety of populations and settings in California. Inclusion criteria for this study included professional affiliation with OTAC, past clinical experience using sensory diets, and being an occupational therapist with an unencumbered license practicing in the United States. The first

page of the survey informed participants of his or her rights and acknowledged that completion of the survey indicated consent.

### Measurement and Data Collection Procedures

The survey consisted of multiple choice, fill in the blank, and check all that apply questions regarding the use of sensory diets in OT practice. An invitation to participate was emailed to members of the OTAC across California. The survey did not require participants to disclose any personal information unless they are interested in completing an in depth follow-up phone interviews for a future study. See appendix A for survey questions.

### Data Analysis

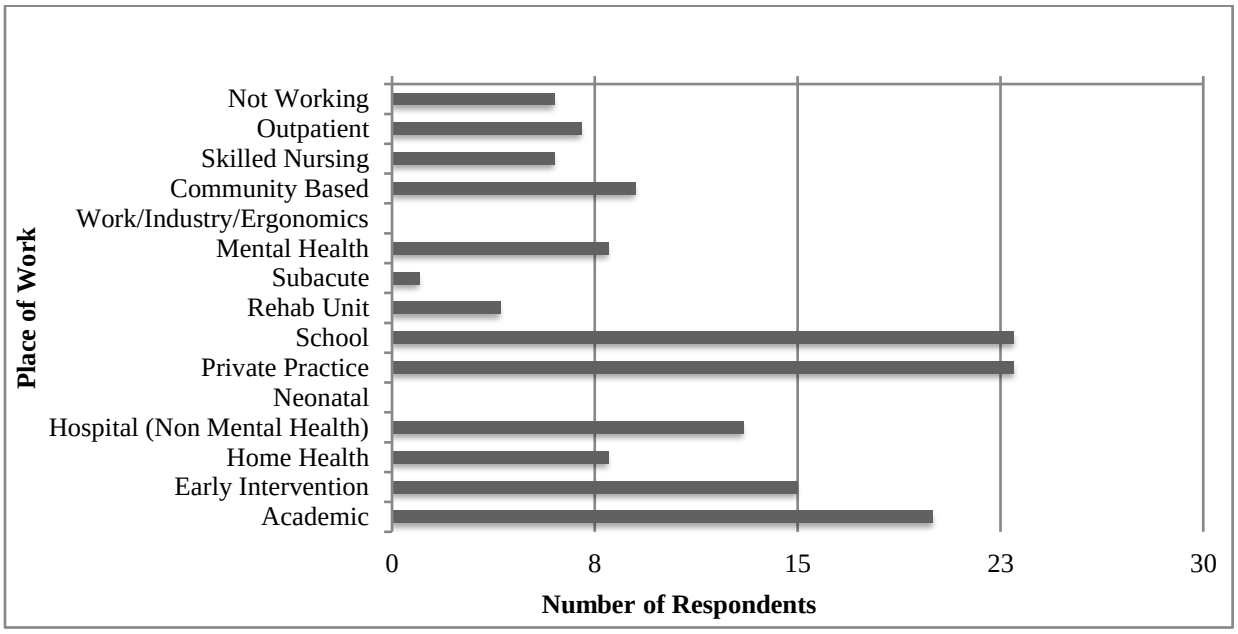
This study gathered quantitative and qualitative data through an electronic survey. Surveymonkey compiled the findings of the survey and the data was then converted to an Excel spreadsheet. The survey produced qualitative and quantitative data and the researchers used descriptive statistics to illustrate and explain the data. Quantitative data was coded using excel, and then was exported to SPSS for further data analysis. The purpose of the study is to discover how OTs are using sensory diets in general while analyzing a large population of occupational therapists.

## Results

The survey's demographics include 98 participants with 23 respondents working at a private practice or school location, 20 respondents reported working in an academic setting, and 15 reported working in early intervention (*Figure 1*). Each respondent had the ability to check multiple places of work in order to prevent answer exclusivity as OTs often work in multiple

settings. The average reported time in practice was 16 years with a standard deviation of 14 years.

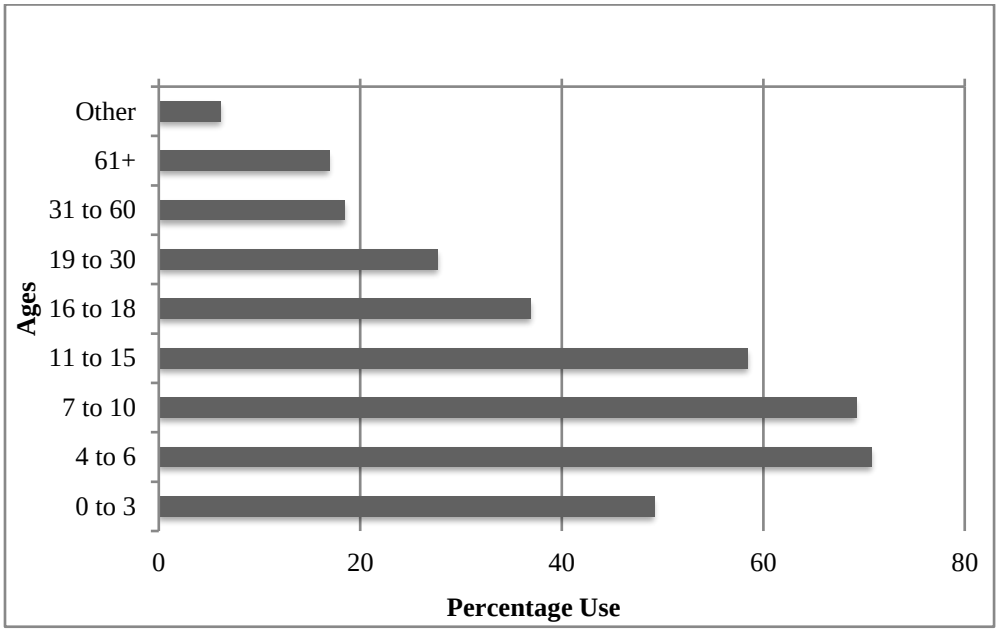
*Figure 1. Reported Place of Work*




Note. The question that this data was acquired from was a check all that apply survey question.

The highest number of therapists who participated the survey reported working in pediatrics (82.5%). Following, 22.2% of therapists reported working in psychosocial and mental health settings. Only 17.4% of therapists reported working in a physical disabilities setting and 12.7% in the geriatrics setting. This data was received from a check all that apply question on the survey; therefore, therapists may have chosen multiple responses. Sensory diets were reported most commonly used with school-aged clients (*Figure 2*).

*Figure 2. Reported Sensory Diet Use by Age*




Note. The question that this data was acquired from was a check all that apply survey question.

To determine what modalities therapists were using, the survey asked about eight different general methods: proprioception, vestibular, tactile, oral/respiratory, visual, auditory, physical activity, and self-regulation programs. As can be seen in Table 1, each general method had multiple types of sensation specific method to choose from in order to accurately represent the therapy being used. For example, the general tactile method had six different types of tactile use: textures, vibration, light touch, swaddling, massage, and Therapressure. The purpose of this was to allow the survey respondents to choose as many therapies that he/she uses in a sensory diet, which is characteristic of a sensory diet because each client has unique needs, and each use a variation of modalities to maintain their optimal level of arousal throughout the day.

*Table 1. Modalities Reported*

| Modalities | |
|---|---|
| **Type** | **Total Reported** |
| **Proprioception** | 61 |
| Heavy Work | 50 |
| Joint Compression | 52 |
| Jumping | 43 |
| Weighted Vests | 37 |
| Therapy Balls or Sit Cushions | 45 |
| Fidgets | 45 |
| **Vestibular** | 53 |
| Swinging | 44 |
| Spinning | 33 |
| Rolling | 30 |
| Jumping | 46 |
| Slides | 32 |
| Bikes | 21 |
| Scooter Boards | 28 |
| Astronaut Program | 11 |
| **Tactile** | 60 |
| Textures | 50 |
| Vibration | 36 |
| Light Touch | 17 |
| Swaddling | 24 |
| Massage | 36 |
| Therapressure | 25 |
| **Oral/Respiratory** | 58 |
| Aromatherapy | 20 |
| Chewing/Oral Work | 45 |
| Food/Drink | 37 |
| Whistles | 26 |
| Breathing Exercises | 36 |
| **Visual** | 49 |
| Change Light | 46 |
| Colors | 21 |

| | |
|---|---|
| **Auditory** | 48 |
| Music | 40 |
| Sound Based Therapies | 20 |
| Therapeutic Listening | 15 |
| ILS | 4 |
| Other | 5 |
| **Physical Activity** | 56 |
| Playground | 41 |
| Sports | 24 |
| Leisure/Walking | 20 |
| Yoga | 40 |
| Martial Arts | 14 |
| Dance | 24 |
| Aerobic Activity | 22 |
| Bikes | 27 |
| Swimming | 24 |
| Gymnastics | 19 |
| **Self Regulation Programs** | 56 |
| Zones of Regulation | 37 |
| ALERT Program | 40 |
| Social Thinking | 12 |
| Other | 15 |

Note. This was a check all that apply question.

A short answer question was asked in order to determine how therapists were deciding what to include in the sensory diet for his or her clients. The following were some responses that were received:

> I have patients complete the interest inventory on Sensory Diet and also the adolescent/adult sensory profile with the accompanying treatment/sensory motor recommendations, so they choose the sensory motor activities which they are drawn to. I also observe their behavior and take in their self report of what helps them to self regulate well.

Use it with the child in session with the parent observing and identify the change in behavior afterwards to determine if it is calming, alerting, or otherwise. Have parents practice it at home and chart with result they are experiencing. Have parent identify patterns of behavior/arousal throughout the day and what change they are looking for. Show them where they can place the tools to make that change and how to switch it around if it is not working.

Another short answer question from the survey asked about potential alternative terms that therapists referred to sensory diets as. The most commonly reported terms were: sensory strategies, sensory tools, sensory stimulation, home program, sensory modalities, sensory breaks, sensory supports, and neurosensory retraining.

## Discussion & Limitations

### Discussion

The purpose of this study was to fulfill the purpose of further examining the use of sensory diets in occupational therapy. This included gathering qualitative and quantitative data regarding the current use of sensory diets in occupational therapy practice within California. Currently, there is limited research on the evolution of sensory diets and their use outside of the pediatric population. Overall, this study offers new insights into how sensory diets are being used in various populations with different ages in California

The significant findings of this study include the use of sensory diets in a variety of populations and settings, frequently used modalities, and practitioners' process of individualizing treatment for each client. While participants reported the highest occurrence of implanting sensory diets with clients, aged 4 to 6, sensory diets are used across the lifespan, as reported by the survey. There were also participants representing, pediatrics, geriatrics, mental health, and

physical disabilities, thus, creating an overall representation of a variety of clinical populations and settings.

Proprioception was the most frequently reported sensory modality. However, each type of modality was reported being used by at least 48% of respondents. The detailed list of specific modalities (*Table 1*) displays the highest reported proprioceptive modalities. The expansive results from *Table 1* show that sensory diets commonly include a variety of modalities. This wide range of results may imply that sensory diets are currently being client-driven. This supports the initial intention of Patricia Wilbarger for sensory diets to be individualized.

The results of this study are unique because there are no studies available on the current use of sensory diets. The results gathered by this study are important to the field of occupational therapy because they provide empirical evidence of the use of sensory diets in a variety of clinical populations facilitating evidence-based practice. This study was necessary to create a foundation and better understanding of the current use of sensory diets.

The clinical reasoning reported by therapists commonly incorporated the use of assessments such as, the sensory profile assessment and clinical observations. Therapists interviewed parents and caregivers and looked to identify patterns of behavior in the individual's daily routine. Many therapists then implemented a sensory diet and reassessed the effectiveness throughout treatment.

The findings implied a lack of clear understanding of the term "sensory diet" among OTs. The term, meant as a metaphor, might be confusing for practitioners, clients, and caretakers involved. While the term might be misunderstood, the concept of a sensory diet has representation across populations. The sensory diets being implemented incorporate multiple sensory systems to help the individual throughout his or her day. Based off the misunderstanding

of the term “sensory diet”, the researchers suggested a possible name change to “sensory schedules”. The term “sensory schedules” has the potential to promote better understanding of the concept that sensory input is needed throughout an individual’s day to facilitate optimal arousal.

**Potential Limitations**

The study aimed to include OTs working in various settings for the purposes of generalizing to the entire profession. In addition, there tends to be a misconception that sensory diets are only used in pediatric practice. However, the survey was distributed to pediatric, psychosocial, and physical disability OTs to analyze how sensory diets are implemented in all areas. While the majority of participants were practicing in pediatrics, there were many other participants who worked with other populations. However, there were no subjects who worked in the neonatal intensive care unit. As mentioned, Patricia Wilbarger originally created sensory diets while working in a neonatal intensive care unit. The lack of data about this population could be seen as a potential limitation of understanding how sensory diets are used among all practice settings. More subjects or expanding the study to a larger group would have possibly provided data about the use of sensory diets with this population. One limitation may be that only 98 participants responded to the survey. More participants would have provided a more encompassing view of how sensory diets are being implemented throughout all populations and settings.

Another limitation of this study is that it is not generalizable. The participants came from a convenience sample of occupational therapists that work in California, therefore, the results cannot be considered representative of the United States. It is also possible that some of the questions on the survey may have been misinterpreted. Collecting feedback about the survey

draft before distributing the final draft to OTAC lessened this possible misinterpretation. However, open-ended questions can tend cause confusion for the participant. There were several limitations that could have affected the results of this study. To fully address the perceived limitations, a study analyzing occupational therapists across the United States working with a variety of populations would be beneficial.

**Summary, Conclusions, & Recommendations**

Due to the gap in current literature examining the use of sensory diets among occupational therapists in all settings, this exploratory research aimed to shed light on incorporating sensory diets as an intervention across domains. By gathering quantitative and qualitative data from OTs practicing in California through a survey, insight was gained about what therapists incorporate in sensory diets and how they implement them depending on the population they work with. This research has the potential to benefit all OTs practicing in all settings. Various strategies of what to include in the implementation of a sensory diet, as well as what sensory strategies work best with certain populations will lead to more impactful use of sensory diets. In particular, there is a lack of empirical research in the geriatric setting. The researchers suggest further research about the specifics of the use of sensory diets through semi-structured interviews of occupational therapists as well as individuals or family members who have experienced the use of sensory diets in their own lives.

# Appendices

## APPENDIX A
## SENSORY DIET SURVEY

1. Where are you primarily employed?
    1. Academic
    2. Early Intervention
    3. Free Standing Facility
    4. Home Health
    5. Hospital (Non Mental)
    6. Hospital Neonatal Unit
    7. Private Practice
    8. School Setting
    9. Rehabilitation Unit
    10. Subacute facility
    11. Mental Health Setting
    12. Work/Industry/Ergonomic Setting
    13. Community Based
    14. Skilled Nursing Facility/Assisted Living
    15. Other (fill in the blank)

2. How many years have you been practicing? (fill in the blank)
3. Have you heard of sensory diets? Yes/No
4. Have you used sensory diets as an intervention? Yes/No
5. Are you currently using sensory diets in your practice? Yes/No
6. How did you learn about sensory diets?
    1. Online
    1. In school
    2. A special topic/ continuing education course
    3. A book
    4. Other publication

7. What age population do you use sensory diets with (check all that apply)?
    1. 0-3 years old
    2. 4-6 years old
    3. 7-10 years old
    4. 11-15 years old
    5. 16-18 years old
    6. 19-30 years old
    7. 31-60 years old
    8. 61 years old and older
    9. Other (fill in the blank)

8. What clinical population do you use sensory diets with (check all that apply)?
    1. Pediatrics

2. Psycho-social/Mental health
3. Physical disabilities
4. Geriatrics

9. How frequently do you recommend sensory diets?
    1. Less than 25% of caseload
    2. 25-50% of caseload
    3. 50 -75% of caseload
    4. More than 75% of caseload

10. If you are using sensory diets… Which of the following components do you use (check all that apply or open response)?
    1. Proprioception
        1. Heavy work
        2. Joint Compression or Weight Bearing
        3. Weighted vests, lab buddies or blankets
        4. Therapy balls or sit cushions
        5. Hand fidgets or toys (such as squeeze balls)
        6. Other_____

    2. Vestibular
        1. Swinging
        2. Spinning
        3. Jumping/trampoline
        4. Tricycles, scooters or bikes
        5. Scooter boards
        6. Astronaut Program
        7. Other_____

    3. Tactile
        1. Textures
        2. Vibration
        3. Light touch
        4. Deep pressure
        5. Swaddling
        6. Massage
        7. Therapressure/Wilbarger Protocol/Brushing
        8. Other_____

    4. Oral/respiratory/olfactory
        1. Aromatherapy
        2. Chewing gum/oral work
        3. Food and drink
        4. Whistles
        5. Respiration activities

5. Visual environment changes
    1. Change lighting or level of light
    2. Use specific colors or color palate

6. Auditory
    1. Music
    2. Sound-based therapeutic program (e.g. Thearpeutic Listening, ILS, etc.) if yes, which ones _____
    3. Other_____

7. Physical activity (i.e. outdoor activities, running, etc.)
    1. Playground activities
    2. Sports
    3. Leisure (hiking?)
    4. Yoga
    5. Martial Arts
    6. Dance
    7. Aerobic activity (running, biking, etc.)
    8. Other_____

8. Self Regulation Programs
    1. Zones of regulation
    2. ALERT program
    3. Other_____

9. Others – fill in the blank

10. Do you incorporate the client's family or other caregivers to help implement the sensory diet? Yes/No

11. How do you decide which sensory diet strategies to recommend? Short answer.

12. What training have you had to implement sensory diets or other sensory-based interventions? Short answer.

13. Are you willing to participate in a follow up email?
    Name (optional)
    Email (optional)
    Phone Number (optional)

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