

5-2022

Adults with Sensory Defensiveness and Their Use of Coping Strategies

Cassidy McCurdy *Dominican University of California*

Sonia Patiño *Dominican University of California*

Julia McMahon *Dominican University of California*

Sophia Hagen *Dominican University of California*

<https://doi.org/10.33015/dominican.edu/2022.OT.08>

IRB Number: 10969

Survey: Let us know how this paper benefits you.

Recommended Citation

McCurdy, Cassidy; Patiño, Sonia; McMahon, Julia; and Hagen, Sophia, "Adults with Sensory Defensiveness and Their Use of Coping Strategies" (2022). *Occupational Therapy | Graduate Capstone Projects*. 41.

<https://doi.org/10.33015/dominican.edu/2022.OT.08>

This Capstone Project is brought to you for free and open access by the Department of Occupational Therapy at Dominican Scholar. It has been accepted for inclusion in Occupational Therapy | Graduate Capstone Projects by an authorized administrator of Dominican Scholar. For more information, please contact michael.pujals@dominican.edu.



This thesis, written under the direction of the candidate's thesis advisor and approved by the program chair, has been presented to and accepted by the Department of Occupational Therapy in partial fulfillment of the requirements for the degree of Master of Science in Occupational Therapy.

Cassidy McCurdy, Sonia Patiño, Julia McMahon, and Sophia Hagen
Candidate

Julia Wilbarger, PhD, OTR/L
Program Chair

Julia Wilbarger, PhD, OTR/L
First Reader

Adults with Sensory Defensiveness and Their Use of Coping Strategies

By

Cassidy McCurdy, Sonia Patiño, Julia McMahan, & Sophia Hagen

A culminating capstone project submitted to the faculty of Dominican University of California
in partial fulfillment of the requirements for the degree of Master of Science in
Occupational Therapy.

Dominican University of California

San Rafael, CA

Spring 2022

Copyright © Cassidy McCurdy, Sonia Patiño, Julia McMahon, & Sophia Hagen, 2021.

All rights reserved.

Abstract

Purpose: The purpose of this study was to develop and pilot a questionnaire examining the relationship between sensory defensiveness and coping strategies, as well as establish typical ratings for sensory defensiveness among the adult population. *Methods:* Through snowball sampling, 91 participants completed the Sensory Response Questionnaire containing 69 questions. Participants' responses to questions concerning sensations and coping strategies in various situations indicated levels of sensory defensiveness. Levels of sensory defensiveness were determined by mean ratings: < 2 low sensory defensiveness (Low SD), 2-2.5 some sensory defensiveness (Some SD), > 2.5 moderate sensory defensiveness (Moderate SD). *Discussion:* Kinnealy et al. (1995), estimates that 15% of the population has some level of sensory defensiveness that impacts daily life. This number may be a slight underestimate as there were a higher percentage of participants in the Low and Moderate SD categories. Coping strategies were confirmed from previous research but are used based on specific situations. *Limitations:* Demographics were not generalizable to the broad adult population, access to the internet was a requirement to complete the questionnaire, and there were misunderstandings regarding proper completion of a portion of the questionnaire. Lastly, the questionnaire required participants to report accurate self-assessments to answer the questions. *Conclusion:* Most adults generally experience sensations that are bothersome, but those do not negatively impact daily life or occupational engagement compared to adults with moderate or definite sensory defensiveness. Occupational therapists have the unique skill set to address sensory defensiveness with clients and facilitate engagement in occupations using positive coping strategies.

Acknowledgments

We would like to thank the California Foundation for Occupational Therapy for the seed money grant awarded to us. We would also like to thank all our participants for taking their time to contribute to our research. A big thank you to Dr. Julia Wilbarger for her continuous guidance that helped make our research possible. Lastly, thank you to our family and friends for their love and support.

Table of Contents

Abstract.....	iii
Acknowledgments.....	iv
Table of Contents.....	v
List of Tables	vii
List of Figures.....	viii
Introduction.....	1
Sensory Integration	3
Praxis	4
Vestibular-Bilateral	4
Sensory Discrimination and Perception	4
Sensory Modulation.....	5
Coping Strategies	6
Impact on Occupations.....	8
Impact on Mental Health.....	9
Unique Role of Occupational Therapy.....	10
Summary and Conclusion	12
Purpose.....	14
Ethical and Legal Considerations	15
Methods.....	17
Design.....	17
Participants	17
Measures and Instruments.....	18
Procedures and Data Collection	20
Data Management and Analysis.....	20
Quantitative	20
Qualitative	21
Results.....	22
Quantitative Results	22
Sensory Defensiveness Category.....	23

Coping Strategy by Sensory Defensiveness Category	24
Sensory System by Sensory Defensiveness Category	25
Coping Strategy Score by Sensory Systems.....	26
Qualitative Results	27
Discussion	30
Impact on Occupations.....	32
Implications for OT.....	33
Limitations	34
Future Recommendations for Research	36
Conclusion	37
References.....	38

List of Tables

Table 1 Demographics	22
Table 2 Examples of Qualitative Responses	28

List of Figures

Figure 1 Distribution of Sensory Defensiveness Categories	24
Figure 2 First Choice Coping Strategy by Sensory Defensiveness Category.....	25
Figure 3 Mean Rating of Sensory System and Sensory Defensiveness Category	26
Figure 4 Mean Frequency of First Choice Coping Strategy by Sensory Systems.....	27

Introduction

Sensations in everyday environments have a direct positive or negative effect on individuals, whether it is hearing traffic, smelling a favorite food, touching the softness of a blanket, or feeling the motion of being in a car. The sensory systems, which are responsible for detecting and encoding stimuli, are constantly working every second of the day for the human body and mind to function and respond appropriately to the environment. The central nervous system (CNS) modulates sensations in an acceptable manner to create adaptive responses to our environment. In this context, an adaptive response represents the body's production of an appropriate and expected response to the stimuli that is presented. Sensory integrative dysfunctions impact adaptive responses, distorting the typical or appropriate processing of one or multiple sensations within the CNS. These dysfunctions can occur in individuals of any age or gender, but it is most widely researched in children.

Sensory integrative dysfunction is prevalent in 5.3-13.7% of the child population (Ahn et al., 2004). This statistic may not accurately reflect the entire population affected due to the lack of education and awareness surrounding sensory integrative dysfunctions. Currently, there are no statistics or data available that document sensory dysfunctions in adults, specifically sensory defensiveness which is a subcategory of a sensory integrative dysfunction. The lack of data indicates that the topic of sensory defensiveness is not well-researched beyond childhood. Although minimal research exists focusing on sensory defensiveness in the adult population, the number of studies is inadequate, and they utilize small sample sizes.

Sensory defensiveness is a common form of sensory integrative dysfunction in which a person is "over-responsive and overwhelmed by ordinary sensory input and reacts defensively to it, often with strong anxiety and activation of the sympathetic nervous system" (Parham &

Mailloux, 2015, p. 268). The nervous system may in turn signal the body and mind to find a way to cope with the noxious stimulus. The way that a person copes either before, during, or after encountering a noxious sensory stimulus is an important component of adapting to sensory defensiveness. The coping strategies an individual utilizes may affect their daily activities and occupations. Occupational therapists (OTs) play an important role in assisting individuals with sensory defensiveness due to their knowledge about sensory integration and the effects sensory input has on occupational participation. Further, OTs already provide individualized, evidence-based interventions for children with sensory integrative dysfunctions in order to increase their quality of life and engagement in meaningful activities. OTs would be able to help adults with sensory defensiveness and other sensory integrative disorders, the same way that they currently help children, if there were enough information to guide them regarding how and to what extent adults are affected while also examining the coping strategies utilized by this population.

Although some research documents sensory defensiveness in adults and their use of coping strategies, the studies included few participants, making it difficult to generalize findings across the broad population. There is also limited research focused on the impact sensory defensiveness has on a person's life and how occupational therapy can improve their experiences. Using mixed method research, the purpose of this study is to establish and explore baseline typical ratings for sensory defensiveness and coping strategies in the adult population through the development and pilot of a questionnaire. The following literature review will explore sensory defensiveness in adults including their use of coping strategies, impacts on occupations and mental health, and the unique role of occupational therapy (OT). Reviewing these topics will reveal the knowledge gap surrounding adults who experience sensory defensiveness and the various coping strategies they use throughout their daily lives.

Sensory Integration

Sensory integration (SI) is a theory developed by occupational therapist and psychologist A. Jean Ayres (Ayers, 1973). With her advanced training in neuroscience, Jean Ayres developed this theory to explain the relationship between deficits in interpreting sensations from the body and environment with difficulties in academics and motor learning (Bundy & Lane, 2020).

Sensory integration is the organization of sensations for effective use of the body to produce adaptive responses. In her book, *Sensory Integration and the Child: Understanding Hidden Sensory Challenges*, Ayres describes sensory integration as a process in which “the brain locates, sorts, and orders sensations-somewhat as a traffic officer directs moving cars” (Ayres & Robbins, 2005).

For some individuals, this process of sensory integration does not happen properly in the brain, which is referred to as sensory integrative dysfunction. When the brain is not successful in processing the sensory information from the environment, it usually is not successful in adapting to new challenges. When there is a lack of effective sensory integration, it is difficult to learn, solve problems, and function in general. This leads to the individual typically feeling uncomfortable and having difficulty coping with ordinary demands and stress (Ayres & Robbins, 2005). Depending on the type of sensory integrative dysfunction, the demand for coping will differ for the individual.

Within the broad category of sensory integrative dysfunction, there are subcategories related to different ways sensory input is processed. Most practitioners refer to four general categories: praxis, vestibular-bilateral, sensory discrimination and perception, and sensory modulation problems (Parham & Mailloux, 2015).

Praxis

Praxis problems are typically characterized by “difficulty with motor planning that emerges in early childhood that cannot be explained by a medical diagnosis, developmental disability, or environmental constraint” (Parham & Mailloux, 2015, p. 272). Jean Ayres coined the term somatodyspraxia to “refer to a sensory integration deficit that includes poor praxis and impaired tactile and proprioceptive processing” (Parham & Mailloux, 2015, p. 272). These individuals will typically be clumsy, awkward, and have great difficulty performing novel motor activities, experiencing frustration when they are unable to complete them. A relationship has been established between visual perception and visually directed praxis; this is referred to as visuo-dyspraxia. Ayres referenced this term to describe patterns in which these functions are identified as areas of difficulty (Parham & Mailloux, 2015).

Vestibular-Bilateral

Vestibular-bilateral problems represent another category of sensory integrative dysfunction. Individuals with these types of SI dysfunction typically struggle with head and neck control, balance and bilateral coordination, and vestibular functions. These individuals have a shorter post rotary nystagmus duration which is associated with limitations in smooth sequencing of bilateral movements. Vestibular-bilateral problems are seen in individuals as clumsiness or incoordination, difficulty with team sports, slumping or slouching when sitting and doing academic tasks, and attention difficulties (Parham & Mailloux, 2015).

Sensory Discrimination and Perception

Another category of sensory integrative dysfunction is sensory discrimination and perception problems. Within an individual, “discrimination refers to the brain’s ability to

distinguish between different sensory stimuli, and perception is the brain's process of giving meaning to sensory information" (Parham & Mailloux, 2015, p. 270). A disorder within these systems typically presents itself as inefficient or inaccurate organization of sensory information; for example, "difficulty differentiating one stimulus from another or difficulty perceiving the spatial or temporal relationships among stimuli" (Parham & Mailloux, 2015, p. 270).

Discrimination or perception problems can occur within any sensory system and can also present as comorbidities for individuals with sensory defensiveness. Along with sensory discrimination problems, individuals can have tactile discrimination difficulties as well. These difficulties present problems for the individual in terms of interpreting tactile stimuli in a precise and efficient manner. Typically, "tactile perception operates at such an automatic level that, when it is not working well, compensation strategies take a great deal of energy" (Parham & Mailloux, 2015, p. 270).

Sensory Modulation

The final category of sensory integrative dysfunction is sensory modulation problems which involves evaluating whether a response is appropriate and adaptable for optimal performance, considering the changes that occur in the environment (Stackhouse et al., 1997). Within sensory modulation there are varying behaviors that characterize different types of sensory modulation difficulties. An individual can be under-responsive or over-responsive to sensory stimulation. In this context, the individual has problems with the process of sensory registration. "The process of sensory registration is critical in enabling efficient function so that people pay attention to stimuli that enable them to accomplish desired goals" (Parham & Mailloux, 2015, p. 267). An individual who is under-responsive does not notice or register relevant environmental stimuli. This can present safety concerns because of the lack of ability to

register potentially painful or dangerous sensory stimuli. On the other end of the spectrum, there are individuals who experience sensory over-responsivity, commonly referred to as sensory defensiveness. These individuals are over-responsive to typical sensory input and produce a defensive behavior, resulting in distress and activation of the sympathetic nervous system (Parham & Mailloux, 2015). “This, in turn, may lead to behaviours associated with sensory sensitivity such as fearfulness, cautiousness, or sensory avoiding” (Pfeiffer & Kinnealey, 2003, p. 176). There is a very high rate of coexisting sensory over-responsiveness, including sensory defensiveness, with anxiety disorders, being that both conditions involve states of over-arousal, and the coping mechanisms tend to overlap (Parham & Mailloux, 2015).

Coping Strategies

Many adults who experience sensory defensiveness may also develop coping strategies, whether they are aware of them or not, in order to continue their daily routines and occupations. Coping strategies can be adaptive or maladaptive behaviors, habits, or routines developed by a person in order to overcome discomfort. Kinnealey, Oliver, and Wilbarger (1995) conducted a qualitative study of 5 adults, ages 22-45, who had sensory defensiveness in order to identify common adaptive coping mechanisms. The researchers used the Adult Sensory History Interview to gather insight on the participants' reactions to different stimuli and asked them to detail their perception of certain sensations. They found six common coping strategies used by people living with sensory defensiveness which are broken up into two groups. Avoidance and predictability are the first set of strategies that focus on the perceptions, reactions, or feelings involving sensations. Mental preparation, counteraction, talking through, and confrontation are the second set of strategies that focus on how a person addresses an experience that was perceived to be

aversive in order to lessen the sensory response (Kinnealey et al., 1995). These coping strategies aid a person with sensory defensiveness to live their life.

Kinnealey, Oliver, and Wilbarger (1995) found that avoiding was the most common coping strategy. Individuals would choose not to partake in activities or be in environments that would increase their sensory arousal. The ability to predict sensory stimuli provides a sense of control and organization for any situation that may heighten an individual's affected sensory system. This means that a person may organize their day around predicting what sensations they will encounter that could result in defensiveness and create a plan to manage or control the situation or environment to reduce discomfort. Mental preparation is used by simply preparing one's mind for the day, event, or activity. Talking through is a means of self-talk in order to get through an aversive sensory event or situation in which the aversive sensory stimulus has already been experienced. Counteraction is a strategy that uses non-noxious sensory input or calming techniques to impede the aversive sensation being experienced, such as pressure, physical activity, or taking deep breaths. Lastly, confrontation refers to addressing the aversive stimuli head-on by enduring the uncomfortable sensations, despite sensory defensive reactions (Kinnealey et al., 1995). These coping strategies have the potential to increase or decrease occupational participation, but they by no means treat sensory defensiveness. In the study, the participants felt the coping strategies took too much of their energy and emotional attention, which negatively affected their quality of life (Kinnealey et al., 1995). By understanding these coping strategies, OTs can get a more holistic view of an individual to better address and treat sensory defensiveness in adults.

Maladaptive coping strategies are sometimes incorporated into the daily life of individuals who have low sensory thresholds (Bailey et al., 2015). These strategies typically

result in short-term relief, though they can have negative long-term effects, such as self-injurious behaviors. Anger may be attributed to poor sensory processing patterns and can potentially result in maladaptive behaviors, such as substance abuse (Stols et al., 2013). Another maladaptive coping strategy is pain catastrophizing which is an amplified negative cognitive response to actual or anticipated pain experience and is often due to the perceived inability to control pain (Engel-Yeger & Dunn, 2011b). This is a result of a person's nervous system telling them the pain is much worse than it is because the stimulus cannot be processed appropriately. Though these maladaptive coping strategies are crucial for OTs to understand, they are not a key factor in further understanding positive, or adaptive, coping strategies for adults with sensory defensiveness in order to implement interventions to increase daily functioning.

Impact on Occupations

Research describing the negative impacts on the daily lives and occupations of adults who have sensory defensiveness is limited. Adults with sensory integrative dysfunction are likely to have difficulties related to work performance, role competence, and successful role competence as it relates to preferred occupations, in conjunction with an impact on social participation (Quint et al., 2019). In addition, sensory defensiveness is likely to impact self-care, intimacy, and all life choices (Abernathy, 2010). Individuals may be missing out on the opportunity to participate in activities they find meaningful and would otherwise participate in if they did not have sensory defensiveness. Johnson and Irving (2008) described the unfortunate result of adults being unable to follow a specific career path due to the overwhelming amount of noxious sensory stimuli present in the environment and instead opting for occupations that they do not find gratifying. In a few narratives of adults with sensory defensiveness, individuals explain how they withdraw socially by avoiding certain activities involving social interaction or

being in large social groups (Kinnealey et al., 1995). These adults also described the impact sensory defensiveness has on their leisure occupations, with some noting the avoidance of roller coasters, fun houses, and traveling as a result of the sensory aversions they face during these activities (Kinnealey et al., 1995). Some adults stated their troubles with intimacy, both romantically and non-romantically as a result of sensory defensiveness. One individual completely avoids any intimate activity with another person by making excuses when the situation arises. Another individual stated the unpleasant feelings she experiences when her young daughter touches her and tries to give her hugs and kisses. The mother must initiate the contact with her daughter to feel more in control of the situation and for the touch to be somewhat tolerable (Kinnealey et al., 1995). Understanding all the experiences adults with sensory defensiveness undergo in relation to the impact on occupations or daily activities is imperative for OTs to gain more insight and knowledge in order to better serve this population.

Impact on Mental Health

Along with the impacts on occupations, adults also experience negative mental health behaviors as a result of sensory defensiveness. Adults with sensory defensiveness tend to have a higher incidence of anxiety than adults without sensory defensiveness (Engel-Yeger & Dunn, 2011). This occurs because the stimuli that the adults find noxious induces stress and anxiety when being around the stimulus or when knowing in advance that there is a possibility of encountering the stimulus. The coping strategies that adults with sensory defensiveness use may also be a contributing factor to their anxiety and stress and are described as being, "...time and energy consuming, emotionally exhausting, and may not be socially acceptable" (Abernathy, 2010). Adults may not be fully aware that some coping strategies they use may have negative effects that create more harm than good. Some individuals with sensory defensiveness realize

that the people they are around do not feel the same way that they do about sensory stimuli and they begin to feel or think they are “crazy” (Kinnealey et al., 1995). Abernathy (2010) described that when adults with sensory defensiveness use the coping strategy of avoidance, they “protect themselves from the sensations in the environment by which they feel threatened.” She goes on to compare that this behavior is commonly seen in anxiety disorders, especially agoraphobia, which can be debilitating in severe cases due to such high levels of anxiety. Adults with sensory defensiveness also report having more depression than adults without sensory defensiveness (Johnson & Irving, 2008). More severe consequences of sensory defensiveness include self-harm and even suicide (Abernathy, 2010). These mental health ramifications should not be ignored as they may become very serious. Further research is necessary to gain more insight on the mental health effects of sensory defensiveness in adults since the outcomes can be undisputedly detrimental to their health.

Unique Role of Occupational Therapy

OTs can help individuals with sensory defensiveness in several ways. Based on the literature, the main methods that OTs use to treat sensory defensiveness are through education, assessment, and intervention. OTs can educate their clients about sensory defensiveness but in order to be clinically effective, the therapist must also be educated by the client about their unique sensory experiences, sensory sensitivities, and responses to stimuli in daily life.

Individuals must be aware of how they react to different sensations. OTs can have their clients’ complete assessments or evaluations such as the Adolescent/Adult Sensory Profile (Brown & Dunn, 2002), Adult Sensory History Interview (Kinnealey et al., 1995), Adult Sensory Questionnaire (ASQ) (Kinnealey & Oliver, 2002), and Adult Sensory Interview (ADULT-SI)

(Kinnealy et al., 1999) as a means of understanding their clients as well as help the client better understand themselves.

The Adolescent/Adult Sensory Profile (Brown & Dunn, 2002) looks at an individual's neurological threshold (high or low) and their behavioral response (passive or active). The scores fall into four quadrants: low registration, sensation seeking, sensory avoidant, and sensory seeking. The Adult Sensory History Interview (Kinnealy et al., 1995) is a semi-structured interview that asks about sensory processing in daily life, looking at each of the sensory systems and how their processing impacts occupations. The ASQ (Kinnealy & Oliver, 2002) is a "26-item true/false questionnaire developed to screen for sensory defensiveness in adults. It is a self-administered questionnaire which can be given to a group or an individual" (Pfeiffer & Kinnealey, 2003, p. 178). A score of 10 or more is indicative of sensory defensiveness. The ADULT-SI (Kinnealy et al., 1999) is also used to measure sensory defensiveness. "It is an 82 item, semi-structured, open-ended question format to elicit information regarding a person's perception and responses to various sensory stimuli" (Pfeiffer & Kinnealey, 2003, pp. 178-179). It has an overall scoring range from 0 to 82 with each question receiving a score of 1 (defensive) or 0 (non-defensive).

The results of the assessments can be used to determine which sensory systems are most affected, meaning which sensory systems are most sensitive to stimuli. The results can also highlight how the client may react to different stimuli; however, these assessments do not help us understand how the client copes with their sensory defensiveness. Currently there are no assessments that address coping strategies and how effective or ineffective they may be. If a questionnaire was developed to assess these issues, OTs would have the capability to provide

tailored interventions that would support lifestyle management using coping strategies, which may improve quality of life for someone with sensory defensiveness.

Jean Ayres' work with sensory integration outlined numerous interventions that can be used with individuals who have sensory integrative dysfunction. Generally, the interventions provide different sensory inputs through activities or tools such as brushes, swings, or balls to meet the goal of organizing the nervous system (Zimmer & Desch, 2012). These interventions, however, are targeted toward the pediatric population without addressing the substantial population of adults who experience SI dysfunction. Two interventions that have been found to work effectively with sensory defensiveness are Sensory Diets and Therapressure. Sensory Diets are scheduled into daily life using specific sensory-motor activities that fit an individual's needs (Wilbarger & Wilbarger, 2020). The Therapressure Program utilizes deep pressure touch input with a Therapressure Brush and joint proprioception and compression input. A strict protocol must be followed to achieve the full benefit of the Therapressure Program (Wilbarger & Wilbarger, 2020). These interventions have been used by OTs to decrease sensory defensiveness in an individual in order to achieve and maintain optimal arousal, thus improving quality of life.

Summary and Conclusion

There have only been a few studies conducted with small sample sizes that target sensory defensiveness within the adult population. Roughly 15% of adults may be affected by sensory defensiveness, which shows a great need for more research (Wilbarger & Wilbarger, 1991). The direction of past research has primarily been focused on sensory integrative dysfunction within the pediatric population. There has been one research study targeting coping strategies but because of its relatively small sample size, the results are unable to be generalized. There are several sensory assessment tools and strategies available for OTs to identify sensory integrative

dysfunction, such as the Adult Sensory History Interview (Kinnealy et al., 1995) or the Adolescent/Adult Sensory Profile (Brown & Dunn, 2002), but they are broad in scope and do not provide thorough information to address sensory defensiveness. There is no assessment to identify coping strategies for adults with sensory integrative dysfunction, despite the minimal research available on coping strategies. More data is needed in order to provide targeted intervention for adults with sensory defensiveness. Adults with sensory defensiveness, as well as the field of occupational therapy, would benefit from tools to gather and analyze data on sensory responses from this population and to identify the strategies that are used to cope with sensory defensiveness. OTs would benefit from this data in order to create more precise occupational profiles for their clients, help clients understand their coping strategies, and provide tools to incorporate positive coping strategies into their life. Lastly, OTs attending to an individual's coping strategies will allow for therapeutic interventions to be tailored to individual needs in the hope of alleviating or lessening the impact of sensory defensiveness and identifying areas of improvement to increase quality of life.

Purpose

There is minimal research investigating adults with sensory defensiveness and in the few articles available, the sample sizes were small and therefore not easily applicable to the general population. The field of occupational therapy would benefit from more vigorous studies with larger sample sizes to gain clarity concerning adults with sensory defensiveness and the coping strategies they use in their daily lives. The aim of this study was to establish typical ratings for sensory defensiveness among the adult population and identify the coping strategies they use. In this mixed methods research study, the goal was to develop and pilot a questionnaire to examine the relationship between sensory defensiveness and coping strategies. The research hypothesis was that coping strategies would remain consistent throughout different sensory systems and that a higher sensory defensive score would relate to an increase in the frequency of coping strategies used.

Ethical and Legal Considerations

This research study was approved by the Institutional Review Board for the Protection of Human Subjects (IRBPHS) at Dominican University of California (DUC) (IRB#10969) for the use of human subjects in research. The study adhered to the ethical standards as laid out in the Belmont Report, which was signed into law in 1979 in order to protect basic ethical principles through established guidelines on research involving human subjects (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). The three ethical principles addressed are respect for persons, beneficence, and justice. Respect for persons means autonomy and self-determination, though those that do not have autonomy are entitled to safeguards (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). In this study, all participation was voluntary, and participants could withdraw their participation at any time without risk of penalty. Participants received full disclosure of participation for research, right to refuse, and informed consent. The second principle of beneficence was upheld by protecting participants from harm and maximizing benefits, respecting their decisions, and ensuring their well-being. There were no known physical risks to participants from this study. There were questions within the questionnaire that asked about potential stressors in a participant's everyday life, which could have resulted in distress or discomfort, but participants could choose to withdraw or skip questions. The third and final principle set by the Belmont Report is justice, which certifies that no person will experience injustice of race, sex, gender, social, culture, or any other form of bias through their participation and will also receive fair treatment with a right to privacy (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979).

There were no direct benefits to the participants, though they could gain self-awareness

of their sensory systems and potential coping strategies. Participants could also have the satisfaction of providing information towards research that has the potential to help others. The information collected through the questionnaire was confidential and only included general demographic information in order to research how sensory defensiveness impacts different ages, sexes, or cultures. Any contact information that was provided by the individual, including email addresses, was removed from the main database and kept in a separate database unique from the other through password protected files. No URLs were collected from the participants. All data collected will be destroyed after one year, following completion of the research study. Julia Wilbarger, PhD, OTR/L, has given verbal permission to use and adapt her Sensory Response Questionnaire.

Methods

Design

This research study was conducted through an exploratory mixed method design of quantitative and qualitative data, both gathered through a questionnaire asking about sensory processing and coping strategies. Through the utilization of a mixed methods study, more extensive data was collected regarding the experiences of individuals in challenging situations and how they cope. This data identified any additional coping strategies not found in previous research along with clarifications of current coping strategies. The independent variables of the quantitative research were the sensory systems (gustatory, olfactory, auditory, vestibular, visual, and tactile) and coping strategies (avoidance, predictability/controlling environment, tolerance/confrontation, counteraction, talking through/ mental preparation). The dependent variables were the various rating scores from the Sensory Response Questionnaire (sensory defensiveness score, coping strategy score, coping strategy score by sensory defensiveness, sensory system by sensory defensiveness score, and coping strategy score by sensory systems). The qualitative data was gathered in an open-ended comment portion of the questionnaire in which participants had the option to explain a coping strategy or address something not stated in the questionnaire.

Participants

In this study, 91 individuals participated with full inclusivity of gender, race, ethnicity, culture, and religion. The participants were recruited via convenience and snowball sampling through email and the use of multiple social media platforms with a hyperlink to Google Forms, the platform used for the questionnaire. After completing the questionnaire, participants had the option to enter their email for a drawing to win one of two \$25 Amazon gift cards. They also had

the option to provide an email address if they wanted to receive overall results at the conclusion of the research study. The consent clarified that no individual interpretation or diagnostic measures of the results could be provided to the participants. The name and email address they provided were kept confidential.

As a means of obtaining informed consent, an introduction page was shown on the Google Form for participants to read before starting the questionnaire. The consent form stated that the questionnaire was still being developed and had not yet been established for clinical utility; therefore, any results from the questionnaire could not be interpreted at this time. Completion of the questionnaire was indicative of consent. This research study was approved by the DUC-IRB, reference number 10969.

Measures and Instruments

The Sensory Response Questionnaire contained 46 questions asking about responses to sensation that indicate sensory defensiveness in 6 different domains: gustatory, olfactory, vestibular, auditory, visual, and tactile. Sensory defensiveness is defined as negative, avoidant, or aversive responses to sensation that are not typically thought of as irritating or harmful (Wilbarger & Wilbarger, 2019). Respondents rated each question on a four-point Likert scale: 1-Strongly Disagree, 2-Disagree, 3-Agree, and 4-Strongly Agree.

The questionnaire had a second section consisting of 23 questions focused on addressing the use of common coping strategies when confronted with various sensory situations. Participants were asked to rate the top 3 coping strategies they would most often use in a specific sensory situation, with 1 being the most preferred strategy and 3 being the strategy they would least likely use. These coping strategies include avoidance, predictability/controlling environment, tolerance/confrontation, counteraction, and talking through/mental preparation

(Kinnealey et al., 1995). Avoidance is choosing not to partake in activities or be in environments that would increase one's sensory arousal. Predictability/controlling the environment is a means of organizing the entire day around predicting what sensory stimuli will be encountered that could result in defensiveness. Tolerance/confrontation addresses the aversive stimuli head-on by enduring the uncomfortable sensations, despite sensory defensive reactions. Counteraction is using non-noxious sensory input or calming techniques to impede the aversive sensation being experienced. Lastly, talking through/mental preparation is using self-talk and preparing one's mind in order to get through an aversive sensory event or in a situation that causes increased sensory defensiveness.

In order to establish reliability in administration, each participant was given the same questionnaire with the same instructions to complete on their own. The questionnaire was sent to current occupational therapy students before sending to participants to ensure face validity. Content validity and research reliability was met through initially sending a pilot version of the questionnaire to OTs currently working in the field. This ensured that the questionnaire was easily understood by those who did not create it and to confirm that it was an adequate tool to assess consistency and accuracy of sensory defensiveness and coping strategies.

Measurements for sensory defensiveness score were determined by how many 'agree' or 'strongly agree' answers were selected within each sensory system. This score determined the overall functioning of the individuals' sensory systems and identified the sensory defensiveness category. Coping strategy score was measured by the selection of the first choice of coping strategy used in the situations. The coping strategy score by sensory defensiveness category determines the correlation between coping strategies used with differing levels of sensory defensiveness. Sensory systems by sensory defensiveness category scores were measured by the

most common disturbances in each sensory system across the sensory defensiveness categories. Coping strategy score by sensory systems was determined through the coping strategy that was most often used within each specific sensory system.

Procedures and Data Collection

Data collection methods for this study included receiving and recording the information from the completed Sensory Response Questionnaire via Google Forms. All data was kept within Google Forms until downloaded by researchers to a secure file. Instructions were provided at the beginning of the questionnaire with a disclaimer stating that the questionnaire is not for treatment or diagnostic purposes; therefore, participants were not debriefed after they completed the questionnaire. If a participant was interested in receiving their results, they were able to include their email address and a summary of the study results would be sent to them; no individual results would be provided. The participants were required to be in a setting where they had access to the internet since the questionnaire was in an online format. The participants could identify a setting where they would be comfortable and able to focus for the designated length of time required to complete the questionnaire. To reduce threats to validity and interrater reliability, identical questionnaires with the same instructions and disclaimers were sent to all who chose to participate. As a result, no training was needed, and reliability was based on clear instructions provided to the participants.

Data Management and Analysis

Quantitative

Questionnaires were kept confidential unless the participant chose to enter in the drawing to win an Amazon gift card. Responses were stored on a Google Drive folder that was password

protected and accessible only to the researchers and faculty advisor. The responses were coded into the categories of the Likert scale for measuring sensory defensiveness among adult participants. Descriptive statistics were used to find the frequency of sensory experiences in all sensory systems for sensory defensiveness categories, the first choice of coping strategy by sensory defensiveness category, and the frequency of first choice coping strategy by sensory systems. Data checking for accuracy and missing values was established through the first 10% of the questionnaire responses when team members coded the questionnaire for themes. These codes were then compared to the codes of the other two team members.

Qualitative

The open-ended comments section of the questionnaire regarding coping strategies informed qualitative data. The data was analyzed by the team for consistent themes using a thematic analysis approach. The data was divided among two paired researchers to match qualitative data collected from the participants with the pre-existing codes and to determine if there were any new codes identified from the responses that could not be categorized. Finally, in order to minimize biases, research members met to review all preliminary coding together to ensure no discrepancies were made.

Results

Quantitative Results

The Sensory Response Questionnaire was broadly distributed and received a total of 91 responses. The demographic sample consisted of predominantly young, female, white, and highly educated participants. Table 1 details the demographics of the sample. For the Sensory Response Questionnaire, there was less than 5% missing data. Missing data was replaced by the section mean. A common trend identified was that participants misinterpreted the directions in the coping strategy section. As a result, rather than taking the top 3 choices of coping strategies into consideration for each specific situation, only the number one coping strategy choices were used for data analysis. There were no invalid responses from participants.

Table 1

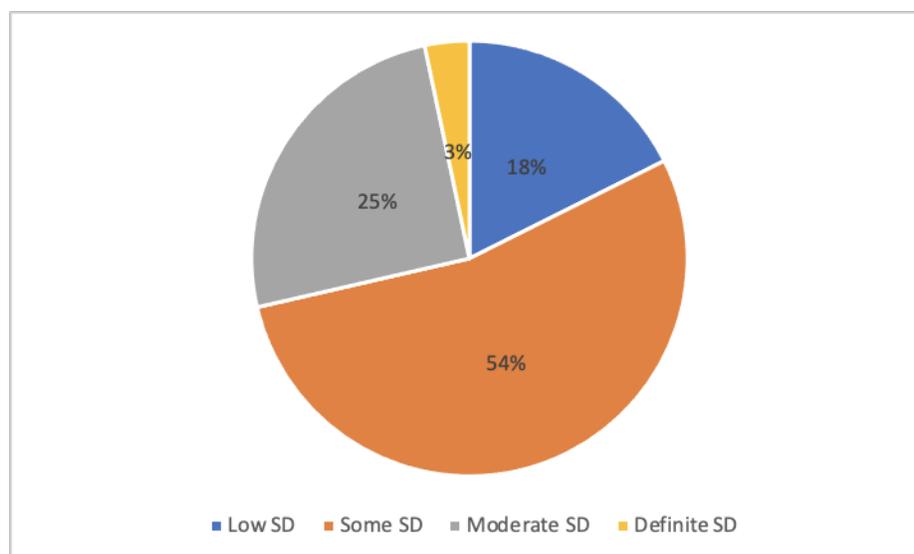
Demographics

	N	% of total sample
Gender		
Male	12	12.9%
Female	78	86%
Other	1	1.1%
Prefer Not to Say	0	0%
Age Range		
18-24	17	19.4%
25-34	41	45.2%
35-44	17	19.4%
45-54	10	10.8%
55-64	2	2.2%
65+	3	3.2%
Highest Level of Education		
Some High School	0	0%
High School	12	12.9%
Associates Degree	14	16.1%
Bachelor's Degree	51	57%
Master's Degree	11	11.8%
Ph.D. or higher	2	2.2%
Ethnicity		
White or Caucasian	48	52.7%

	N	% of total sample
Black or African American	2	2.2%
Hispanic or Latino	21	23.7%
Asian or Asian American	12	12.9%
American Indian/Alaska Native	1	1.1%
Native Hawaiian/other Pacific Islander	1	1.1%
Other race	6	6.5%

Sensory Defensiveness Category

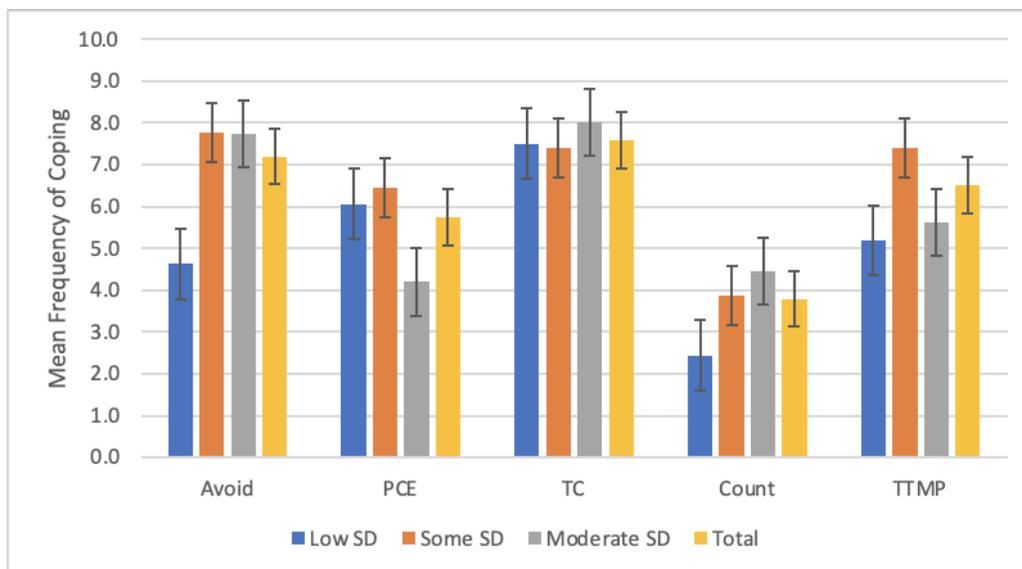
Data from the sensory system questions were rated using a Likert scale of 1-4: 1 being Strongly Disagree, 2 being Disagree, 3 being Agree, and 4 being Strongly Agree. Levels of sensory defensiveness were determined by mean ratings: low sensory defensiveness (Low SD) was characterized by a mean rating less than 2, which meant participants mostly disagreed that sensory stimuli was bothersome; some sensory defensiveness (Some SD) was characterized by a mean rating of 2- 2.5, which meant participants mostly agreed that some sensory stimuli was bothersome; moderate sensory defensiveness (Moderate SD) was characterized by a mean rating of 2.5 or more, which meant participants mostly agreed or strongly agreed that many different sensory stimuli was bothersome. Nearly 54% of participants were grouped in the Some SD category while 28% of the population was grouped in the Moderate SD category (see Figure 1). Only about 3% of participants fell into the definite sensory defensiveness (Definite SD) category, which was characterized by a mean rating of 3 or more; therefore, this data was grouped with the moderate sensory defensiveness category for the purpose of data analyzation.

Figure 1*Distribution of Sensory Defensiveness Categories*

Note. The percentage of possible sensory defensiveness rating scores divided into categories.

Coping Strategy by Sensory Defensiveness Category

Avoidance and tolerance/confrontation were the top two most common coping strategies to be employed across all categories of sensory defensiveness (see Figure 2). Individuals in the Moderate SD category were slightly more likely to use tolerance/confrontation as a coping strategy over avoidance while individuals in the Some SD category used avoidance slightly more than they used tolerance/confrontation. Compared to tolerance/confrontation, avoidance was not as likely to be employed by participants in the Low SD category. The coping strategy of tolerance/confrontation was used the most overall across all categories of sensory defensiveness. Counteraction was found to be the coping strategy least likely to be used overall but used more by individuals in the Moderate SD category. Predictability/controlling environment was least likely used by participants in the Moderate SD category but more likely to be used by participants in the Some SD category. Talking through/mental preparation was a coping strategy used mostly by participants in the category of Some SD.

Figure 2**First Choice Coping Strategy by Sensory Defensiveness Category**

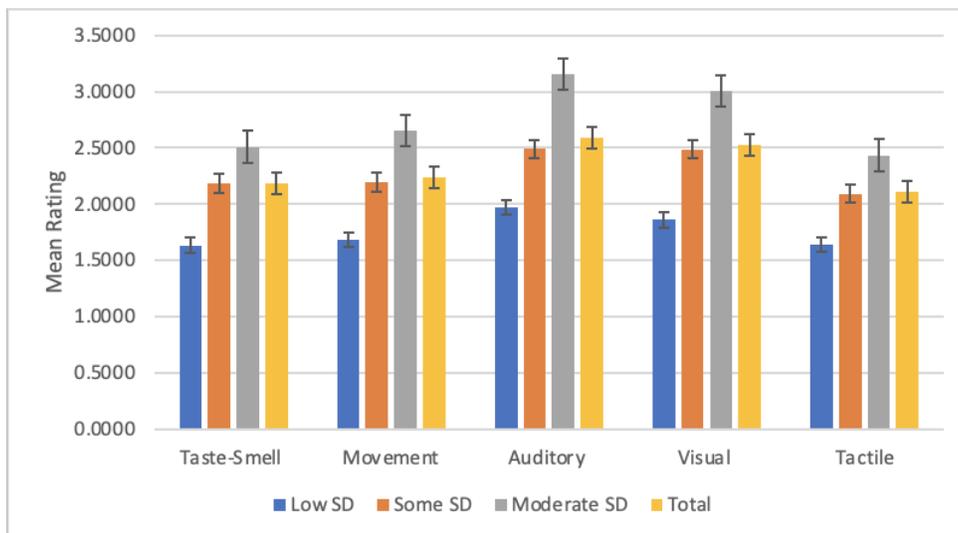
Note. Coping strategy choice by sensory defensiveness category. **Avoid**=Avoidance; **PCE**=Predictability/controlling the environment; **TC**=Tolerance/confrontation; **Count**=Counteraction; **TTMP**=Talk through/mental preparation; **Total**=Average across all coping strategies and sensory defensiveness categories.

Sensory System by Sensory Defensiveness Category

When looking at the individual sensory systems by sensory defensiveness categories, there were consistencies across all levels of sensory defensiveness (see Figure 3). Auditory and visual disturbances are highest among all levels of sensory defensiveness categories with auditory disturbance being slightly higher in those in the Moderate SD category. The tactile sensory system is the lowest disturbance among participants in all categories of sensory defensiveness, apart from those in the Low SD category who have an equally low disturbance of tactile and taste/smell sensory systems.

Figure 3

Mean Rating of Sensory System and Sensory Defensiveness Category



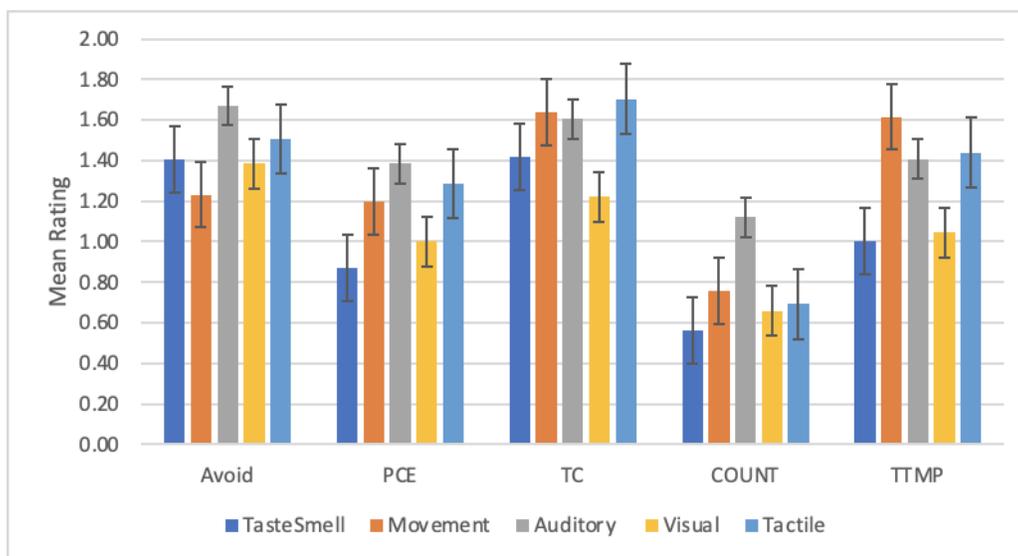
Note. Sensory system (taste/smell, movement, auditory, visual, and tactile) by sensory defensiveness category. **Total**= Average across all sensory defensiveness categories.

Coping Strategy Score by Sensory Systems

Coping strategies differ and do not present any consistencies across the sensory systems (see Figure 4). In the mean frequency of first choice coping strategies by sensory system, disturbances in the tactile system led to a greater likelihood of using tolerance/confrontation as a coping strategy. Tolerance/confrontation and talking through/mental preparation are used more with disturbances of movement stimuli. Participants with visual and auditory disturbances are slightly more likely to use avoidance over any other coping strategy. Individuals with taste/smell disturbances are almost equally likely to use tolerance/confrontation and avoidance as coping strategies. Counteraction is significantly the least used coping strategy across all sensory systems, with a noticeable increase of use within the auditory system.

Figure 4

Mean Frequency of First Choice Coping Strategy by Sensory Systems



Note. Mean frequency of first choice coping strategy score by sensory systems (taste/smell, movement, auditory, visual, and tactile). **Avoid**=Avoidance; **PCE**=Predictability/controlling the environment; **TC**=Tolerance/confrontation; **Count**=Counteraction; **TTMP**=Talk through/mental preparation; **Total**= Average across all sensory defensiveness categories.

Qualitative Results

Most open-ended comments expand on the specific situations, often social settings, in which a person would employ their preferred coping strategy (see Table 2). Quite a few participants described their use of multiple coping strategies for a particular situation, with some listing a sequential order of coping strategies they would use and others describing a combination of coping strategies for one situation. Through analysis of the qualitative data, a social-oriented coping strategy was identified and should be further researched. Further conclusions were made regarding the coping strategies based on comments provided by the participants. Mental preparation/talking through needed to be expanded to include the use of cognitive strategies, such as focusing on something or someone else. In addition, tolerance/confrontation are two very different ways of coping and should be separated as their own distinct coping strategy. With one

question in the questionnaire addressing sexual intimacy, it is important to consider the influence of traumatic experiences and how this may affect an individual's aversion to sensations during intimacy and the coping strategies they use.

Table 2

Examples of Qualitative Responses

	Talk through/ Mental Prep	Tolerance/ Confrontation	Avoidance	Controlling Environment	Counteraction
Auditory	"Talk myself through it and try to focus on the task at hand"	"Let it happen and wait until it's over"	"Avoid if possible"	"...I would just ask them to be a little quieter or I'll change my tone of voice to see if they will to theirs"	"Counteract with music/headphones"
Taste/ Smell	"I usually won't say anything and talk myself into it being a temporary situation"	"Tolerate the taste/smell or just eat a little bit of it to not be rude"	"I would not go somewhere I know has smells that are off putting"	"I'll move away from the smell"	"Find one smell I like and smell that"
Visual	"I'll just mentally focus on the steps in front of me and look straight ahead and not down"	"I'm scared of heights, I know it and actively try to confront it"	"I usually avoid stores that have lighting that I don't like"	"Change my position where I am sitting or standing so the light is not as direct"	"I find something calming and keep the focus"
Move- ment	"Prepare for the experience before hand and realize it's only for a short period of time"	"Just get it over with"	"I would try to avoid those roads as best possible"	"I might choose a smoother route or drive around the rough parts of the road"	"Focus on something else and use breathing techniques"
Tactile	"Keep calm and focus on something else"	"I'll just tolerate it and try not to touch anything"	"I would avoid getting my hands dirty if I cannot clean them"	"I would ask questions and explain my sensitivity to certain textures I cannot have"	"Deep breathing, arms in front around my purse, looking for clear spots to walk"

Note: Qualitative data which includes participants' responses to an open-ended question prompt.

Discussion

The purpose of the study was to establish typical ratings for sensory defensiveness among the adult population, pilot a questionnaire that examines the relationship between sensory defensiveness and coping strategies, and to identify the use and frequency of specific coping strategies. In a previous study by Kinnealy et al. (1995), it was estimated that 15% of the population has some level of sensory defensiveness that impacts daily life. This number may be slightly underestimated as it was found that a higher number of participants were categorized as exhibiting at least some sensory defensive behaviors and 28% were in the Moderate SD category. While many individuals experience sensations that are bothersome, the extent of the aversion may not impact daily life as much as it does with someone who has moderate or severe sensory defensiveness.

Research data supports preliminary validation of this questionnaire as a good scale for identifying sensory responsiveness and coping strategies among adults as evidenced by the establishment of content validity and research reliability from current OTs who specialize in the field of sensory processing. The questionnaire assists in identifying sensory defensiveness categories in adults and gathers information regarding how they cope with sensory defensive behaviors in a variety of situations. However, the categories of sensory defensiveness severity need to be further established. Those who fell into the Moderate SD category was far higher than expected. The category scores require further validation in order to create clinical utility.

Data indicated that the coping strategy categories reconfirmed previous coping strategy categories established by Kinnealy et al. (1995) as evidenced by both the quantitative and qualitative portions of the research. Following data collection and analysis, clarifications in the description of and distinctions between coping strategies such as talking through/mental

preparation and tolerance/confrontation had to be made. Adding a social-mediated strategy would be beneficial for a further understanding of additional coping strategies. It is important to note that although maladaptive coping strategies were not addressed in this research, they do exist and should be considered especially with individuals who have severe sensory defensiveness.

The research hypothesis stated that coping strategies would remain consistent throughout different sensory systems. Results were not consistent with this hypothesis, and it was found that not all coping strategies are used equally. Data indicates the use of a particular coping strategy as being dependent on specific situations rather than being attributed to an entire sensory system. The primary coping strategies individuals favored in situations where sensory stimuli provoked uncomfortable feelings were avoidance and tolerance/confrontation.

The second part of the research hypothesis stated that a higher sensory defensiveness score would relate to an increase in frequency of coping strategies used within one's life. Results were consistent with this part of the hypothesis. Individuals in the Low SD category exhibited low engagement with coping strategies due to the unlikelihood that they are bothered by stimuli in various situations while those in the Moderate SD category utilized more coping strategies. Individuals in the Low SD category were more likely to utilize preparation/controlling environment and tolerance/confrontation as their primary coping strategies, although it should be noted that tolerance/confrontation should be seen as two separate categories. Based on the qualitative results, most participants tolerated bothersome stimuli and few participants described confronting the stimuli.

Overall, research indicates that all individuals, regardless of sensory defensiveness category, are far less likely to use counteraction as a coping strategy. OTs can help increase the

use of counteraction as a coping strategy since counteraction involves utilizing more soothing sensory sensations to oppose the uncomfortable sensory stimuli that an individual faces in a particular situation. This data is significant to the field because OTs can support individuals, especially those with increased sensory sensitivities, to have positive and predictive strategies to cope with difficult situations in the best way possible to fit their unique needs.

Impact on Occupations

According to existing literature, adults with sensory defensiveness or other sensory integrative dysfunctions experience a negative impact on various occupations including searching for jobs (Johnson & Irving, 2008), participating in social or leisure events, and being intimate with others (Kinnealey et al., 1995). The data collected in this study confirms the impact that sensory defensiveness has on occupations among the adult population. Many participants chose avoidance as the first coping strategy they would use when faced with potential overstimulation of sensory input in specific scenarios and/or environments. Choosing to avoid these situations indicates a disruption in the daily life of participants and their engagement in occupations. Other coping strategies were used such as talking through/mental preparation or tolerance/confrontation which can preoccupy the individual's mind and take away from the full experience or enjoyment of the occupation. When choosing a specific strategy or explaining their responses, some participants considered social norms when faced with an event that was overstimulating. This finding emphasizes the social implications of occupations and how the pressures felt by society can have an impact on what occupations adults with sensory defensiveness participate in and to what extent, resulting in limited occupational participation.

Implications for OT

This research data is beneficial to the field of occupational therapy because it provides a pilot questionnaire capable of detecting sensory defensiveness among adults, as well as how they cope, allowing for client-centered and occupation-based interventions to minimize occupational avoidance. With the information gathered in this study, OTs could better support positive lifestyle management by addressing what the most effective coping strategy would be for an individual in a specific situation. For example, if an adult client experiences sensory defensiveness at a grocery store and the coping strategy they use is avoidance, they would not be able to grocery shop for themselves because they are using a nonfunctional coping strategy. With an assessment tool that could help them understand this client's sensory defensiveness and choice of coping strategies, an OT would be able to help this client implement a coping strategy that works for them without inhibiting their independence or participation in activities. OTs have a deep understanding of sensory processing and can use this to guide clients in using active coping strategies such as sensory diets or sensory regulation strategies. Sensory diets, as mentioned previously, are scheduled sensory-motor activities that are specific to an individual's sensory needs. Sensory regulation strategies are sensory-based actions or activities that help regulate the way a person is feeling. Thinking back to the example of the adult client who experiences sensory defensiveness at grocery stores, an OT could determine which specific sensations are causing defensiveness in their client and how the client could counteract the sensation, talk themselves through it, or control an aspect of the situation to make it more tolerable. If this client were experiencing sensory defensiveness around the various smells in a grocery store, an OT could help them figure out a way to try wearing something with a comforting scent as a counteracting coping strategy.

OTs can also address social-oriented coping strategies among adults and how to communicate their needs in social settings. It was discovered through qualitative research that many people fear being judged or thought of as rude or picky if they were to voice their needs. If someone is uncomfortable speaking up about what they need, they are more likely to use maladaptive coping strategies. Lastly, if this questionnaire was expanded to include the possibility that individuals may use maladaptive coping strategies, OTs could use this information to guide clients in a safer, healthier direction. Possessing knowledge about coping strategies adults turn to when they are uncomfortable will give OTs the ability to create unique, client-centered interventions focused on creating healthy and manageable coping strategies for adults with sensory defensiveness.

Limitations

After thorough analysis, this study presented various limitations. Majority demographics consisted of young, female, white, and highly educated participants, signifying a sample population that is not generalizable to the broad adult population. More research needs to be conducted with a wider, more diverse population in order to make broader generalizations. Another limitation included the possibility that individuals with sensory defensiveness or suspected sensory defensiveness were more likely to respond to the questionnaire out of interest surrounding the topic. This could have skewed our participant demographics to have more apparent sensory defensiveness than the general population, again leading to the need for continued research with a wider participant sample.

An additional limitation in this research was a lack of understanding and clear communication in the directions of a portion of the questionnaire. Interpretation of directions varied as a result of misunderstanding the proper way to rank coping strategies, causing altered

and inconsistent responses. Some participants ranked all provided coping strategies as 1, 2, or 3 when the goal of the researchers was to have participants identify only the top 3 coping strategies they would most likely use. This misinterpretation caused the data to present differently for each participant and as a result, the researchers had to adjust their original plan for data analysis.

A third limitation to this study was the reliance of access to and knowledge of the technology necessary to participate in the research. The questionnaire for this study was created solely as a Google Form, needing to be accessed through the internet. Participants had to have basic knowledge and understanding of an electronic device (i.e., smart phone, tablet, or laptop) to access and complete the questionnaire. The questionnaire was also heavily advertised through social media or email, restricting participation to individuals who were familiar and competent with technology. This limitation may have restricted some of the adult population from participating and adding their data to the sample, signifying the inability to use this research as generalized knowledge for the whole population. More data needs to be collected to include those members of the population that do not have access to or knowledge of the technology necessary to participate in this original research.

A fourth and final limitation was the nature of the questionnaire used to collect the data. The questionnaire was a self-reporting questionnaire in which participants were required to report accurate self-assessments and reflections to answer the questions. Data that is acquired through self-reporting always presents with some limitations. The components of self-reported data is as follows: the ability of individuals to be honest when self-reporting, the possibility of an unknown personal bias that might have affected participants' ability to self-report, and the challenge that some individuals have when it comes to introspection.

Future Recommendations for Research

The sensory defensiveness severity category criteria should be refined to be clinically useful. To improve utility, further research should be conducted to refine and distinctly clarify coping strategies and how adults use them. Specifically, research should be done that establishes tolerating and confronting as two uniquely separate coping strategies. Future research should also consider addressing social-oriented coping strategies, maladaptive coping strategies, and how past traumatic experiences, specifically with sexual intimacy, may relate or contribute to sensory defensiveness and use of coping strategies.

In addition, a study with a greater sample size across a larger, variable demographic population would improve the generalization of this information for application in practice. For future consideration, the questionnaire should be offered in various formats to include individuals who do not have access to the internet or prefer a paper format. The recruitment for participants could also be modified to reach a greater number of individuals, especially those who may not have social media or email. Finally, the Sensory Response Questionnaire directions should be amended and simplified for better understanding among the participants in order to collect the most accurate data.

Conclusion

This research study attempted to fill the gap in literature by developing and piloting a unique sensory defensiveness questionnaire that also addresses coping strategies, specifically for the adult population. Understanding that sensory defensiveness among adults is just as prevalent as in children highlights the importance for OT intervention in all stages of life. The data supports preliminary validation of this questionnaire as a good scale for measurement of sensory defensiveness and coping strategy use among adults. The research reconfirmed the previously defined categories of coping strategies for sensory defensiveness. In addition, not all coping strategies are used equally across individuals or sensory systems. Finally, most adults generally experience sensations that are bothersome, but those do not impact daily life or occupational engagement negatively compared to adults with moderate or definite sensory defensiveness. Using their knowledge surrounding the topic of sensory processing and sensory integrative dysfunction, OTs have the unique skill set to address sensory defensiveness with clients and facilitate engagement in occupations using positive coping strategies.

References

- Abernethy, H. (2010). The assessment and treatment of sensory defensiveness in adult mental health: a literature review. *British Journal of Occupational Therapy*, 73(5), 210-218.
<https://doi.org/10.4276/030802210X12734991664183>
- Ahn, R. R., Miller, L. J., Milberger, S., & McIntosh, D. N. (2004). Prevalence of parents' perceptions of sensory processing disorders among kindergarten children. *American Journal of Occupational Therapy*, 58(3), 287-293. <https://doi.org/10.5014/ajot.58.3.287>
- Ayres, A. Jean (1973). *Sensory Integration and Learning Disorders*. Western Psychological Services.
- Ayres, A. J., & Robbins, J. (2005). *Sensory integration and the child: Understanding hidden sensory challenges*. Los Angeles, CA: Western Psychological Services.
- Bailey, K., Meredith, P., Rappel, G., & Strong, J. (2015). Sensory sensitivity and strategies for coping with pain. *American Journal of Occupational Therapy*, 69(4), 1-10.
<https://doi.org/10.5014/ajot.2015.014621>
- Brown, C., & Dunn, W. (2002). *Adolescent/adult sensory profile*. San Antonio, TX: Psychological Corporation.
- Bundy, A. C., Lane, S., Murray, E. A., & Fisher, A. G. (2020). *Sensory integration: Theory and practice* (3rd ed.). Philadelphia: F.A. Davis.
- Engel-Yeger, B., & Dunn, W. (2011a). Relationship between pain catastrophizing level and sensory processing patterns in typical adults. *American Journal of Occupational Therapy*, 65(1), e1-e10. <https://doi.org/10.5014/ajot.2011.09004>

- Engel-Yeger, B., & Dunn, W. (2011b). The relationship between sensory processing difficulties and anxiety level of healthy adults. *British Journal of Occupational Therapy*, 74(5), 210-216. <https://doi.org/10.4276/030802211X13046730116407>
- Johnson, M. E., & Irving, R. (2008). Implications of sensory defensiveness in a college population. *American Occupational Therapy Association Sensory Integration Special Interest Section Quarterly*, 31(2), 1-3.
- Kinnealey, M. & Oliver, B. (2002). *Adult Sensory Questionnaire*. Unpublished raw data. Philadelphia: Temple University.
- Kinnealey, M., Oliver, B., Wilbarger, P. (1995). A phenomenological study of sensory defensiveness in adults. *American Journal of Occupational Therapy*, 49(5), 444–451. <https://doi.org/10.5014/ajot.49.5.444>
- Kinnealey, M., Oliver, B., & Wilbarger, P. (1999). *ADULT-SI Adult Defensiveness, Understanding, Learning, Teaching: Sensory Interview*. Manual. Unpublished. Philadelphia: Temple University.
- National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1979). *The Belmont report: Ethical principles and guidelines for the protection of human subjects of research*. Retrieved from <https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/read-the-belmont-report/index.html>
- Parham, L. D. & Mailloux, Z. (2015). Sensory integration. In J. Case-Smith & J. C. O'Brien. (Eds.), *Occupational therapy for children and adolescents* (7th ed., pp. 258-303). Elsevier.

Pfeiffer, B., & Kinnealey, M. (2003). Treatment of sensory defensiveness in adults.

Occupational Therapy International, 10(3), 175–184. <https://doi.org/10.1002/oti.184>

Quint, N., McKenna, C., Messingschlager, A., Bien, A., & Smith, E. (2019). Exploring the lived experience of adults with sensory processing disorder (SPD): A phenomenological study.

American Journal of Occupational Therapy, 73(4).

<https://doi.org/10.5014/ajot.2019.73S1-PO4010>

Stackhouse, T. M., Trunnel, S. L., & Wilbarger, J. L. (1997). *Treating sensory modulation disorder: The STEP-SI: A tool for effective clinical reasoning*. Denver: The Children's Hospital.

Stols, D., Van Heerden, R., Van Jaarsveld, A., & Nel, R. (2013). Substance abusers' anger behaviour and sensory processing patterns: An occupational therapy investigation. *South African Journal of Occupational Therapy*, 43(1), 25–34.

Wilbarger, P., & Wilbarger, J. L. (1991). *Sensory defensiveness in children aged 2-12*. Santa Barbara, CA: Avanti Educational Programs.

Wilbarger, J. L. & Wilbarger, P.L. (2020). Wilbarger approach to treating sensory defensiveness. In A. C. Bundy & S. J. Lane (Eds.) *Sensory integration theory and practice* (3rd ed., pp 426-431). F.A. Davis.

Zimmer, M., & Desch, L., Rosen, L. D., Bailey, M. L., Becker, D., Culbert, T. P., McClafferty, H., Sahler, O. J., Vohra, S., Liptak, G. S., Adams, R. C., Burke, R. T., Friedman, S. L., Houtrow, A. J., Kalichman, M. A., Kuo, D. Z., Levy, S. E., Norwood, K. W., Turchi, R. M., & Wiley, S. E. (2012). Sensory integration therapies for children with developmental and behavioral disorders. *Pediatrics*, 129(6), 1186–1189.

<https://doi.org/10.1542/peds.2012-0876>