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Brenda McGibbon Lammi, MSc, BHSc, OT Reg(Ont),  
Tel. (613) 587-4124, Fax (613) 587-4121, email: otnow@caot.ca

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# Occupational therapy: Daring to be sensational for everyone

Winnie Dunn



## About the Guest Editor

Winnie Dunn, PhD, OTR, FAOTA, is professor and chair of the Department of Occupational Therapy Education at the University of Kansas Medical Center. She is well known for her work studying sensory processing in everyday life, and characterizing best practices for services with children, their families, and other service providers. She is the author/co-author of all of the Sensory Profile measures, which capture people's responses to sensory events in everyday life, and has conducted numerous standardization, validity, and reliability studies of these measures. She has published more than 100 articles, chapters, and books, and has lectured internationally. She has received the top honors in her field, including the American Association of Occupational Therapists Award of Merit for outstanding overall contributions, the Eleanor Clark Slagle Lectureship for outstanding academic contributions, the A. Jean Ayres Research Award, and she is a member of the Academy of Research for the American Occupational Therapy Foundation. Most recently, she published a book for the public entitled: *Living Sentionally: Understanding Your Senses* which has been featured in Time magazine, Cosmopolitan magazine, and Canadian Public Radio among others. In July 2009, this book received the Seal of Excellence award from the Children of the New Earth magazine to recognize its contribution to supporting strong, resilient families.

clearer that the insights we learned from children and adults with disabilities are more universally applicable

Occupational therapists have known for a long time that sensory processing affects everyday life. We learned about this relationship as we served children with specific disabilities; part of the constellation of their behavior included both challenges with everyday life and intense reactions to sensory experiences. Researchers have verified that sensory processing patterns are different in special populations that have challenges in everyday life, including autism (Kientz & Dunn, 1997; Watling, Dietz et al., 2001; Rogers, Hepburn et al., 2003; Ben-Sasson, 2007), Asperger disorder (Dunn, Myles, et al., 2002; Myles, Hagiwara et al., 2004) and attention deficit hyperactivity disorder (ADHD) (Dunn & Bennett, 2002; Dove & Dunn, in press).

However, as we shared our insights with families, individuals, teachers, and other providers, it became clear that sensory processing patterns were not reserved for those with disabilities. As parents, teachers, and other colleagues began to understand what we were talking about, they shared examples of sensory responses in other children (sometimes their own children), or in themselves. It is becoming

than we might have imagined. In an article in the May 2009 *American Journal of Occupational Therapy*, researchers discuss the sensory processing patterns in children who are gifted (Gere, Capps, et al., 2009). They found that the gifted children had more intense sensory sensitivities than the normative comparison group on the Sensory Profile (Dunn, 1999). They link the children's sensory sensitivities to both their superior problem solving ability and to their challenges with social engagement. This study provides preliminary evidence that our wisdom about sensory processing has many applications, and that we need to think more globally about the influence of our knowledge on people's lives.

The possibilities of a more global impact led to the conceptualization of this special issue of *OT Now*. We invited papers that expanded our current view of sensory processing knowledge and its use in practice, research, and further knowledge development. We wanted to hear about situations in which sensory processing patterns were supporting or interfering with everyday occupations, and how occupational therapy knowledge can be used to support participation in everyone's lives. We asked for examples of using sensory processing knowledge to address participation challenges, even those we might not have identified in our current practices or settings. We solicited authors to summarize the current research, or to report on studies underway to illustrate relationships between sensory processing and participation.

It seems we struck a chord as we received many more submissions than we have room to include. People offered many creative perspectives, all of which have the potential to broaden our view, and expand our practice, research, and knowledge possibilities. We have selected articles that illustrate this broad view. We are grateful to everyone who contributed; the act of conceiving an idea and organizing it for submission moves knowledge forward because the authors and their peers who give them feedback have the seeds of ideas planted. How they will be nurtured and grow will be part of our future landscape.

## And so we begin...

In her introduction, Nancy Pollock updates the evidence brief from the *CANCHILD Centre for Childhood Disability Research website* ([www.canchild.ca](http://www.canchild.ca)). *Sensory integration: A review of the current state of the evidence* outlines the current issues related to the sensory integration literature, and provides a discussion of the key points. She also

provides guidance about how to proceed in practice with the current state of knowledge, focusing on applying sensory processing knowledge to impact participation, which is the focus of this special issue of *OT Now*.

Three articles present personal perspectives of the intersection of everyday life and sensory processing. These articles punctuate the need for occupational therapists to think more expansively about the impact of our knowledge and insights on everyone's lives.

Christine Everdell provides a personal look at her sensory experiences in her article *Being sensational: A clinician's perspective*. She lets the reader in on her internal experience with sensation in everyday life, and points out that the way she looks from the outside and how she is managing from the inside are different. She tells us that she is determined to enjoy life on life's terms, and is grateful to have the knowledge of occupational therapy to enable her to adjust life activities to manage her sensory processing needs.

Chynna Laird offers another personal point of view with her description of her daughter's life in *Sensational blessings: A parent's perspective*. Jaimie is very sensitive to environmental stimuli, and so she has learned to gravitate toward routines and rituals that are predictable for her. We learn how mom and daughter navigate through life in this story, using tools and wisdom from occupational therapy to support a successful and satisfying life.

Pamela Wener, Lisa Diamond-Burchuk, Jacquie Ripat, Lianne Belton, and Dorothy Schwab illustrate how to apply sensory processing knowledge to reframe social situations in their article *Promoting inclusive social environments using a sensory processing simulation*. They take the approach that everyone needs to understand what others might be going through with their differences in sensory experiences. Their objective is empathy and inclusionary attitudes.

Another group of three articles take a broader view of the impact of sensory processing on everyday life as they examine special populations of Tourette's disorder, autism, and fetal alcohol spectrum disorder.

Robin Jewers examines *the Sensory side of Tourette's disorder*. She weaves together the evidence about Tourette's disorder (TD) and the sensory experiences that might be contributing to some of the behavioural rituals of people diagnosed with TD. She wonders about the various relationships among coexisting conditions, sensory processing patterns and TD, and provides the reader with food for thought about alternative ways to interpret children's behaviours.

Susan Robinson and Joyce Magill-Evans provide another perspective in their article *Young children with autism spectrum disorder: Sensory processing and daily life skills*. They report on a small study in which they were investigating possible relationships between sensory pro-

cessing and daily living skills. Their findings are complex, with only a weak relationship emerging in their data; they suggest that sensory processing is only one of many factors affecting occupational performance, a position they proudly claim as obvious for occupational therapists. Reports such as this one remind us that we must be careful in our claims and vigilant observers of reality even with our current wisdom and beliefs.

Brenda Fjeldsted and Ana Hanlon-Dearman considered a specific area of participation in their article *Sensory processing and sleep challenges in children with fetal alcohol spectrum disorder*. They interpret their findings by showing relationships between particular patterns of sensory processing and sleep patterns at night. They offer suggestions for adaptations to the sleep environment that reflect sensory processing knowledge.

The context for occupational therapy has changed in the last several decades. When Dr. Ayres began her work, public laws governing services for public schools and early intervention programs were not yet available. People with disabilities were housed in segregated hospitals, schools, and service centres. Technology for measuring nervous system and brain activity was not capable of detecting fine differences that are possible today. Occupational therapy emphasized practice, with only a few choosing a scholarly path. Today, laws have been updated many times to better meet needs. We recognize the importance of including everyone in neighborhood schools and community activities. Technology and scholarship have enabled us to understand much more about the relationships between brain and behavior.

Occupational therapy has a strong legacy regarding sensory processing knowledge and its application to people's lives. Following other disciplines' paths, we identified many of our constructs by studying children and adults with disabilities because the phenomena were easier to see in these groups. Behaviours were intense and sometimes disruptive; responses were extreme when compared to peers without disabilities. As we have been able to successfully articulate the constructs and their possible relationships to observable behaviours and nervous system activity, more people have become interested in our knowledge, hypotheses, and perspectives. Other disciplines are using our knowledge to advance thinking in their disciplines, and are also identifying the sensory processing contributions to behaviours.

We can also consider how to use our specialized knowledge within the evidence based practices of our interdisciplinary colleagues. For example, the Workgroup on Principles and Practices in Natural Environments, convened by the United States Office of Special Education Programs (OSEP), identified 7 key principles for providing *Early Intervention in Natural Environments* (2007). These

principles include 'children learn best through everyday experiences', 'families can enhance their children's development with supports', and 'families' priorities, preferences and needs guide the interventions and outcomes', among others. Following these principles, we would find ways for a child to get movement needs met during the course of the day. Instead of creating a separate therapeutic environment for swinging, we might encourage the parent to use the swing set and jungle gym when they go to the neighborhood park, by coaching them about why this particular type of play is helpful to the child. Embracing both our knowledge and the guidance from this workgroup, we recognize that the park with the parent IS the therapeutic environment; the 'suspended equipment' is right there in their lives, waiting for an appropriate application. What we have to create is our vision within others' already sensation-filled lives.

We might even say sensory processing knowledge is a tool for universal design. The Center for Universal Design at North Carolina State University provides seven principles for universal design (1997). They define universal design as: "The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." (p.1). The core principles indicate that the design must make the situation equitable, flexible, and tolerant to users, and simple, manageable and intuitive in its use. Isn't this what an effective application of sensory processing knowledge embodies? In the example above, the swing at the park is available to everyone, invites families to use it, is designed so that the family can be successful quickly, and can be used any number of ways to meet not only the child's sensory processing needs, but also the caregiver's needs.

Think of the possibilities for occupational therapy if we think of ourselves as universal designers, and consider everyone eligible to receive our wisdom and insights. We could analyze the entire family and offer suggestions about how the family organizes itself to meet everyone's needs. We could meet with teachers to help them organize their classrooms to meet the teachers' needs and provide options for students throughout the day. Students would not have to be labeled to be eligible for this assistance. Occupational therapists would be of service to the learning community rather than individuals (Dunn, 2009).

In the workplace and in the community, occupational therapists would understand their role in creating flexible, tolerant spaces and varied schedules so that everyone would be productive and satisfied. The more occupational therapists can take leadership in this way of applying our knowledge, the more we simultaneously create a broader impact and make the community a friendlier place for children and adults who have more intense needs.

If we are to apply our knowledge and wisdom

effectively, we must consider the context of today. We recognize that we can have a greater impact because we are imbedded in natural settings like schools, homes, workplaces and community settings. We must not limit our discipline's impact by only looking through the lens of disability. A disability perspective has enabled us to understand concepts that we can now apply to everyone; by using our wisdom for universal design, we serve people with disabilities in additional ways, by making all situations easier to understand and navigate no matter what sensory needs one has. Participation in everyday life is the issue for occupational therapists.

Sensory processing is everywhere, just like people are everywhere. Enjoy this journey of possibilities as you read each author's perspective on sensory processing and participation. We invite you to consider what you can do to broaden your influence with these broader views.

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# Sensory integration: A review of the current state of the evidence

Nancy Pollock

Sensory integration, sensory integrative dysfunction, sensory processing disorder, sensory modulation, sensory diets; all somewhat confusing terms for many occupational therapists, other health professionals, and educators. Imagine how most families must feel! In the 45 years since Jean Ayres presented her Eleanor Clark Slagle Lecture (Ayres, 1963) introducing her concept of sensory integration, the field of sensory integration research and practice has seen tremendous growth and continues to engender strong reactions within and outside the field of occupational therapy. The controversy has recently moved from the professional literature to the lay press. Time Magazine (December 10, 2007) featured an article entitled “*Is this Disorder for Real?*” reporting on the controversy surrounding the move to have sensory processing disorder included in the next revision of the *Diagnostic and Statistical Manual*.

Given the controversial nature of sensory integration, it is important to ensure that practitioners are up to date on the current state of the literature and the evidence. Part of the mandate of the *CanChild Centre for Childhood Disability Research* located at McMaster University in Hamilton, Ontario, is to provide synthesized reviews to assist in translating knowledge from research to practice. Available on our website [www.canchild.ca](http://www.canchild.ca), these reviews are called *Keeping Current* and are written so that families, service providers, and researchers can access them. The *Keeping Current in Sensory Integration*, last updated in 2006, remains one of the most frequently accessed titles on the website, with an average of 650 hits per month. As it is now time to update it, we thought it could also be an important contribution to this special issue of *OT Now*. In this article, I will review the discussions and debates about terminology, identification and diagnosis, review the evidence for the effectiveness of sensory integration interventions, and provide some suggestions for clinicians and families.

## Defining sensory integration

Sensory integration is a theory. As with all theories, sensory integration has a set of assumptions underlying it that propose to explain observed phenomena. As first described by Ayres (1972), sensory integration

is defined as “the organization of sensory information for use” (p.1). It is a neurological process that enables us to make sense of our world by receiving, registering, modulating, organizing, and interpreting information that comes to our brains from our senses. Ayres (1972) hypothesized that some children have an impairment in sensory integration which manifests in difficulties observed in purposeful behaviours. This dysfunction in sensory integration may explain why some children have trouble learning new skills, organizing themselves, regulating their attention, participating in school or play activities, and engaging in positive social experiences. Ayres, and many who have followed her, have worked to establish the validity of this theory through clinical and basic science research.

Through these past decades, researchers and clinicians have explored many aspects of sensory integration in a variety of populations including typically developing children, children with learning disabilities, autism, Aspergers, and attention deficit hyperactivity disorder (ADHD). As well, assessments of sensory integration have been developed and treatment strategies evaluated. Through all of this work, different ideas and understandings about sensory integration have evolved and authors have begun to use different terms to describe their perspectives of sensory integration and propose new models.

Roley, Mailloux, Miller-Kuhaneck, and Glennon (2007) describe the rationale for the recent move to trademark the term Ayres Sensory Integration®. They suggest that the use of this term denotes the adherence to the core principles of Ayres original theoretical framework and distinguishes it from other sensory-based theories and



### About the author –

**Nancy Pollock, MSc, OT Reg (Ont)** is an Associate Clinical Professor in the School of Rehabilitation Science and an Investigator at the CanChild Centre for Childhood Disability Research at McMaster University in Hamilton, Ontario.

treatment approaches. Miller, Anzalone, Lane, Cermak, and Osten (2007) have proposed a taxonomy to enhance diagnostic specificity. They do not suggest a change to the term sensory integration to describe the theory or sensory integration treatment for the intervention approach, but suggest that the diagnostic term be sensory processing disorder (SPD) to distinguish the disorder from the theory. This group has described three subtypes within SPD in their proposed taxonomy which differ from the subtypes identified through the factor analytic studies conducted by Ayres and colleagues (Ayres, 1972b; Ayres, 1989). In an article describing fidelity in sensory integration intervention research, Parham and colleagues (2007) have defined ten core elements that they feel must be present in order for the treatment method to be truly sensory integration treatment. These varying perspectives reflect the difficulties in describing and defining a complex phenomena, and indicate that at present, there is no clear consensus. These controversies also reinforce the importance of practitioners and researchers being very precise and clear in describing their thinking to colleagues and families when using terms related to sensory integration.

### Identifying sensory integrative dysfunction

‘He’s clumsy, and frequently bumps into things.’ ‘She’s a very picky eater.’ ‘He has emotional meltdowns when plans change.’ ‘She insists on wearing the same pair of socks everyday.’ ‘He is too rough when he plays with other children.’ ‘She can’t organize her backpack to bring home the right things from school.’ These are all descriptors that parents frequently offer when talking about their children who may be experiencing difficulties in sensory integration. Parents aren’t very interested in our controversies about terminology. They want to understand what is happening with their child and what to do about it.

Occupational therapists have a number of tools at their disposal to help in understanding what might be happening with these children. Well developed standardized assessments such as the Sensory Profile (SP) (Dunn, 1999) and the Sensory Integration and Praxis Tests (SIPT) (Ayres, 1989) are frequently used. These measures help to describe and measure the child’s behaviour, either directly, in the case of the SIPT, or indirectly through parent completed questionnaires, as in the SP. As norm-referenced measures, the results can be compared to the results of typically developing children and patterns of differences described. Considerable research has shown that these measures are psychometrically robust and able to discriminate differences across children (Ayres, 1989; Dunn & Westman, 1997; 1999; Ermer & Dunn, 1998; Mulligan, 1998).

Several articles have explored the relationship between indicators of sensory processing difficulties and children’s occupational performance (Ahn, Miller, Milberger, & McIntosh, 2004; Baranek et al., 2002; Bar-Shalita, Vatine, & Parush, 2008; Bundy, Shia, Qi, & Miller, 2007; Dunbar, 1999; White, Mulligan, Merrill, & Wright, 2007). More recently, researchers have used neurophysiological measures such as electroencephalography (EEG) (Davies & Gavin, 2007), and measurement of electrodermal activity (changes in the conductivity of the skin related to nervous system activity) to identify differences between typically developing children and those with developmental disorders (Mangeot et al., 2001; Miller et al., 1999; Schaaf, Miller, Seawell, & O’Keefe, 2003).

*“Parents aren’t very interested in our controversies about terminology. They want to understand what is happening with their child and what to do about it.”*

Clinical assessments, observations, interviews, and more direct measures of neurophysiological activity present a strong case that some children do indeed have differences in their behaviours that fall into certain patterns. These children can be clearly identified through the clinical and laboratory tools at our disposal. The questions remain though, as to why they show atypical neurological activity and behaviour. Is it because they have sensory processing problems? Most occupational therapists would answer “yes”. Others outside the field of occupational therapy, for example Heilbroner (2005), disagree and suggest that these sensory processing differences do not represent a distinct disorder but are markers of neurodevelopmental immaturity or symptoms of anxiety. Ultimately, does it matter what causes these patterns of behaviour or only that we can identify them and describe them? Where it does matter of course, is when we move to the question of what do we do about it. If we can identify patterns of behaviour that are interfering with the child’s development, learning, play and participation, we need to determine how best to intervene.

### Sensory integration therapy

Most of the practitioners who use sensory integration therapy are occupational therapists and, as such, the goals of intervention are aimed at enhancing the child’s ability to participate in the daily occupations which are meaningful and satisfying for that child in their natural context. The route to achieving that goal is individually defined, but can be broadly categorized as aiming either to remediate underlying impairments or to enable participation through accom-

modation and adaptation; essentially two different roads to one place. In the former category is sensory integration therapy (SIT) as originally developed by Jean Ayres (1972). This form of therapy is sometimes referred to as classical SIT (Parham & Mailloux, 2005) or now, according to the trademark, as Ayres Sensory Integration® therapy. This treatment approach aims to provide the child with various sensory experiences. These experiences are matched during therapy with

*“Over the past four decades, dozens of research studies have been carried out to evaluate the effectiveness of SIT using a wide variety of study methods and designs (Deams 1994; Miller, 2003).”*

a “just right” challenge, an activity that requires the child to give an adaptive response. SIT is an active therapy. The child must be motivated and engaged in the choice of activities; hence, play is the medium of choice. Activities usually involve large pieces of equipment such as big rolls and balls, trampolines, and suspended equipment that provide intense proprioceptive, vestibular, and tactile experiences. The child is encouraged to explore the equipment and the therapist sets up the activities and the environment to challenge the child to use the sensory input to organize an adaptive response. It typically involves one-to-one direct intervention in an environment that has a variety of specialized equipment.

Over the past four decades, dozens of research studies have been carried out to evaluate the effectiveness of SIT using a wide variety of study methods and designs (Deams 1994; Miller, 2003). Additionally, there have been two meta-analyses (Ottenbacher, 1982; Vargas & Camilli, 1999) and four research reviews (Arendt, MacLean, & Baumeister, 1988; Hoehn & Baumeister, 1994; Polatajko, Kaplan, & Wilson, 1992; Shaffer, 1984). The majority of studies have focused on the use of “classical” SIT with children with learning disabilities and has aimed at improving motor skills, academic performance, behavioural performance and/or sensory and perceptual skills. The results from studies published in the 1970s and early 1980s were very promising; however as research methodologies have become more rigorous, the results have been less favourable for SIT. The more recent meta-analysis concluded that children receiving SIT improved no more than children who received alternate treatments or, in fact, no treatment at all (Vargas & Camilli, 1999). Research reviews, particularly those done outside of the field of occupational therapy have been very critical. Proponents of SIT argue that the studies done to date have not been valid due to methodological

flaws (Miller, Schoen, James, & Schaaf, 2007; Parham et al., 2007). They highlight weaknesses in study design related to the inclusion criteria for the study samples, fidelity to sensory integration treatment principles and limitations in the outcome measures to detect a difference. A recent randomized controlled trial conducted by some of these same authors showed some positive outcomes, but again suffered from many of the methodological flaws they were critical of in other studies (Miller, Coll, & Schoen, 2007).

There has been more effectiveness research conducted on sensory integration therapy than any other intervention in the field of occupational therapy. To date, the evidence of its effectiveness is weak at best. We can continue to argue that the supportive evidence is limited due to methodological limitations and attempt to address these weaknesses in future trials, or we can accept that the results are valid and that classical SIT, used with the populations that have been studied, is not supported by the evidence.

Occupational therapists use other forms of intervention which are based on sensory integration theory, but which differ from classical SIT. These approaches use a sensory integration framework to help understand and explain children’s behaviour, but rather than trying to remediate an underlying impairment, these methods are embedded in the child’s daily routines and focus on working with the children, parents, and educators to adapt the child’s environment in ways that will facilitate the child’s ability to participate. This approach may include such things as modifications to the child’s clothing, altering room configurations, noise or light levels, experimenting with food textures, adapting tools and materials, changing program demands, and so on. These approaches are designed to help children function to the best of their ability given their sensory processing capabilities as opposed to trying to change their underlying neurological functioning. In this way, they are distinct from classical SIT.

Most of the effectiveness research on these types of approaches has been preliminary in nature. While some positive results have been found, for example, in the use of specific interventions such as weighted vests (Fertel-Daly, Bedell, & Hinojsa, 2001; Vandenburg, 2001), the research designs have been less rigorous, such as single-subject designs, case studies, and quasi-experimental designs. The population being studied has also shifted with many of these studies being conducted with children with autism. Case-Smith and Arbesam (2008) in a review of interventions for children with autism cite some positive findings, but again conclude that the evidence for sensory integra-



tion and sensory-based interventions for children with autism is weak and requires further study.

These research findings are of course concerning for those therapists and parents who believe that they see positive changes in the children treated using SIT and for those who want to base their practices on strong evidence. Sensory integration as an explanatory framework has intuitive appeal. We have strong evidence that there are children who present with behaviours and neurological responses consistent with hypothesized sensory processing challenges. We also have strong evidence that these children have difficulties in their daily occupations. The question remains, how do we help these children? The evidence for the types of interventions we have studied to date is weak, yet a significant proportion of occupational therapists report that they continue to use sensory integration as a primary intervention approach (Brown, Rodger, Brown, & Roever, 2007; Rodger, Brown, & Brown, 2005). We need to be careful that the appeal of a treatment approach that, unlike many of our

*“Remember that you are occupational therapists, not sensory integration therapists. Focus first and foremost on the occupations identified by the child and family that are of concern.”*

approaches, was developed by an occupational therapist, doesn't overshadow our commitment to evidence-based practice and to the provision of the highest quality of care to our clients. SIT is a resource-intensive intervention and the time and resources devoted to this therapy mean that the child is not receiving another type of intervention that may potentially have greater benefits.

In summary, the topic of sensory integration remains contentious. Its theoretical underpinnings, its existence as a distinct disorder, and the effectiveness of treatment approaches based on the theory are still under debate. Given the current state of the evidence, here are a few suggestions:

1. Remember that you are occupational therapists, not sensory integration therapists. Focus first and foremost on the occupations identified by the child and family that are of concern.
2. In your occupational analysis, be sure to consider multiple hypotheses for why the child might be having difficulties. Keep an open mind. Remember the old adage “If the only tool you have is a hammer, you'll view every problem as a nail”.
3. If you hypothesize in your clinical reasoning that sensory factors may be impacting on this child, use psychometrically sound measures to support or refute your hypothesis.
4. Set specific and measurable goals that target the

occupation and participation levels of function.

5. Involve the family as partners and think about the changes you can make in the tasks and the environment that will benefit the child more immediately.
6. If you want to use SIT, clearly explain to the family the state of the evidence so they are making an informed choice.

If parents and therapists decide to use SIT, it should always be approached as a trial. Clear, measurable, and functional outcomes should be established. A baseline period of measurement should be undertaken prior to the initiation of treatment. Education of families, teachers, and other team members should always accompany the therapy. Re-assessment using the pre-established outcomes should take place after 8 - 10 weeks of intervention. If SIT is going to be an effective intervention, some positive benefits will be evident by then. If these benefits are not apparent, another approach should be investigated.

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# Young children with autism spectrum disorder: Sensory processing and daily life skills



Susan Robinson and Joyce Magill-Evans



**About the author – Susan Robinson, MSc, OT (C),** is an occupational therapist working with LEAD Foundation, a community based agency providing multidisciplinary in-home treatment to children with autism. This study formed the basis of her Masters thesis.

Children with autism spectrum disorder (ASD) struggle to cope with the demands of daily life in a variety of contexts (Liss et al., 2001). The social and communication difficulties that are part of ASD directly contribute to these children's struggles. It is also not clear the degree to which difficulties in processing of sensory information may also limit their performance of age appropriate daily living activities.

This study examined the relationship of sensory processing scores to daily living skills in children with ASD. Understanding this

relationship may enable occupational therapists to more effectively support self-care occupations and appropriately target interventions, so that these children can function as successfully and independently as possible in their environments.

## Background

Many children with ASD have deficits in sensory processing, which has been defined as “functions related to sensation occurring in the central nervous system; and includes reception, modulation, integration, and organization of sensory stimuli” (p. 480, Bundy, Lane, & Murray, 2002) and has been demonstrated repeatedly in the literature. For example, parents of 40 young children with ASD reported deficits in 8 out of 10 factors on the Sensory Profile (Dunn, 1999) including deficits in tactile sensitivity, under-responsive/ seeks sensation, and auditory filtering (Watling, Deitz, & White, 2001). In addition, children with ASD (n=38) differed in their sensory processing from both typical children (n=1075) and children with attention deficit hyperactivity disorder (n=61) based on parent report using the Sensory Profile (Ermer & Dunn, 1998). It was

also reported by Tomcheck and Dunn (2007) that 95% of 281 preschool children with ASD showed sensory processing dysfunction on the Short Sensory Profile (SSP) total score. As a final example, the social, emotional, and behavioral responses on the Vineland Maladaptive Behavior scores for 22 young children with ASD were shown to be associated with SSP scores (Baker, Lane, Angley, & Young, 2008).

Sensory processing deficits are also apparent on other caregiver report instruments. Using the Sensory Experiences Questionnaire, 69% of 56 children with autism had overall sensory symptoms (Baranek, David, Poe, Stone, & Watson, 2006). Ninety percent of 33 individuals with autism had sensory symptoms determined by the Diagnostic Interview for Social and Communication Disorders, which collects information on a range of behaviors and developmental skills, including sensory symptoms (Leekam, Nieto, Libby, Wing, & Gould, 2007). Children with autism differed from comparison children in both the frequency and pattern of sensory abnormality (abnormalities across multiple sensory domains). In addition, sensory differences persisted across both age and IQ domains.

## Occupational performance

Occupational therapists are concerned with the ability of children with ASD to function within their home, school, and community environments, and seek to support the development of their daily living skills. Theories of occupational performance indicate that sensory processing abilities contribute to one's ability to successfully complete activities of daily living (Baum & Baptiste, 2002). White, Mulligan,



**About the author – Joyce Magill-Evans, PhD, OT(C),** is a Professor of Occupational Therapy at the University of Alberta with a long-standing interest in children with autism and their families. She coordinates the University Autism Research group for students and researchers.

Merrill, and Wright (2007) suggest that addressing sensory processing challenges may be useful for many children having difficulty with basic self-care tasks. Therapists apply theory and research and address the sensory difficulties of children with ASD assuming that this may help to remediate a variety of daily living skills. The results of this study show that, though this may be partially true, therapists need to address more than the sensory processing differences in these children.

## Method

A convenience sample of 20 children was drawn from three non-profit agencies in Calgary and one in Edmonton. To be included, children were ages 5 to 7.5 years old; diagnosed with ASD by a developmental pediatrician or chartered psychologist based on criteria specified in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association,

*“The results of this study show that, though this may be partially true, therapists need to address more than the sensory processing differences in these children.”*

2000); had an IQ of 79 or above on the Kaufman Brief Intelligence Test- Matrices Test (Kaufman & Kaufman, 1990); and parents spoke and read English to complete the Short Sensory Profile (Dunn, 1999), the Self Care Functional Skills scale of the Pediatric Evaluation of Disability Inventory (PEDI) (Haley, Coster, Ludlow, Haltiwanger, & Andrellos, 1992), and provide written consent.

Children with more typical cognitive development were selected in order to examine the relationship without confounding effects due to more global developmental delays. Children in early school years were selected as self-care skills are very important for school participation.

## Results

On the Short Sensory Profile total score, three (15%) of the children scored in the ‘typical performance’ range, nine (45%) in the ‘probable difference’ range, and eight (40%) in the ‘definite difference’ range. With the exception of three children, the children with ASD were under or over responsive to sensory input from their environment in comparison to the responses of typical children. On the factor scores, 70% of the children scored in the typical performance category for movement sensitivity and visual/auditory sensitivity factors. The highest frequency for definite differences occurred on the auditory filtering factor (55%),

followed by the factors for under-responsive/seeks sensation (40%) and low energy/weak (40%).

On the PEDI Self Care scale, the mean standard score was 30.0 (SD=9.6), with scores ranging from 13.6 to 50.8. On this scale, the mean standard score is 50, with a standard deviation of 10. Scores less than 30 indicate a significant degree of difficulty with self care activities. Ten children (50%) had scores in this range.

There was little, if any ( $r=.23$ ), relationship between standard scores on the PEDI and SSP category scores (typical= 1, probable difference = 2, definite difference= 3) (Munro, 2001). When PEDI scores were converted to categorical scores (scores 30+ = 1, scores < 30= 2), Spearman’s rho correlation was .36, indicating a small relationship (Munro).

Looking at individual children (see Table 1), the three children who scored in the typical range on the SSP had scores in the typical range on the PEDI (32 to 38). For the two children who scored the highest on the PEDI, one was in the definite difference range for the total SSP score and the other scored in the probable difference range.

**Table 1- Scores on Short Sensory Profile and the Pediatric Evaluation of Disability Inventory**

	Scores on PEDI	
	Typical (30+)	Atypical (<30)
Total Score: Short Sensory Profile		
Typical	3	0
Probable Difference	4	5
Definite Difference	3	5

## Implications

The high prevalence of sensory processing challenges in our sample is in keeping with the literature cited earlier. Clearly, occupational therapists should continue assessing the sensory processing of children diagnosed with ASD to help caregivers and others better understand their responses to their environment. Strategies can be implemented to enable children to better cope with their sensory experiences and to help others to appropriately modify the sensory environment so the children can focus on activities and occupational tasks. Activities can be tailored to their unique sensory needs.

The lack of a significant relationship between sensory processing and daily living skills in these 20 young children with ASD and relatively typical cognitive development suggests that there are other factors impacting the performance of self-care skills.

This study is not the first to identify a small relationship between self-care skills and sensory processing differences and therefore this finding is not simply due to the small sample or the measurement tool selected. Jasmin and colleagues (2009) also found no significant relationship between the total SSP score and daily living skills as measured on the Vineland Adaptive Behavior Scales for 35 Canadian children with ASD who were three to four years old. They found a relationship similar to ours with self-care on the WeeFIM ( $r = .32$ ). Baker, Lane, Angley, and Young (2008) reported a correlation of .43 between the total SSP score and the Vineland Adaptive Behavior Scales daily living skills for 22 children ranging from two to eight years of age with ASD and a range of cognitive levels. The weak relationship of sensory processing and daily living skills is no surprise to occupational therapists who are well aware of the multiplicity of factors that influence all areas of occupational performance. Addressing sensory processing alone will not necessarily result in an improvement in daily living skills. Therapists need to assess all the factors that may make daily living tasks challenging, look for ways to limit the impact of these constraints, and then directly address the specific tasks of concern to the child and family.

Children with ASD and atypical sensory processing can develop relatively typical daily living skills. For example, a child with sensitivity to various tactile inputs can be taught to dress himself independently using tolerated clothing textures allowing him to participate in a kindergarten program. Additional intervention may focus on increasing the range of textures tolerated in order to make clothing options easier in the future. Immediate intervention needs to be focused on the specific goals and tasks of priority to the child and family rather than on broad underlying processes (Hillier, 2007). Understanding the sensory processing of a child with ASD does not mean that one can predict their daily living skills. However, understanding their sensory processing provides rich contextual information within which to position intervention.

Future research needs to address the relative strength of different constraints experienced by children with ASD. Understanding the relative contribution of specific factors including sensory processing, motor skills, communication, behaviours, and social skills to occupational performance areas such as play and self-care for children with ASD would help identify discrete beginning points for intervention.

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## Sensational blessings: A parent's perspective

Chynna Laird

For an average child, someone else's light touch on their skin would go almost unnoticed. But for a child with sensory processing challenges, any sensory stimulation not invited or prepared for can be overwhelming and even painful to endure.

My six-year-old daughter, Jaimie, has sensory processing challenges that affect all of her sensory systems, from moderately to severely. Even a simple act of affection is enough to send her into the throws of a meltdown. For example, when Jaimie was about two-and-a-half, Jordhan, her ten-month old sister, had developed a normal curiosity for everything her big sister did. One afternoon as Jaimie played preschool games on the computer, Jordhan pulled herself to standing, her hands resting on my leg, to watch Jaimie play. Jaimie craved stimulation so the room echoed with noise; television blasting, Wiggles playing on the stereo, and her computer game beeping. Jaimie's eyes quickly scanned around the room every few seconds but, amazingly, she was still able to concentrate on her game. Then it happened: Jordhan's hand slipped onto Jaimie's leg.

Jordhan's light touch caused Jaimie's breathing to get more and more rapid until she was almost hyperventilating. After a moment, Jaimie stuck her face right down into Jordhan's, screeching, "No touch me, Jordy. Get off!" Then shoved Jordhan, knocking her on her back.

As I tried telling Jaimie not to yell at or push Jordhan, she threw the computer mouse, ran over to the couch, and released a long scream, holding her leg as if Jordhan's touch scalded her. I had learned from experience not to touch her as it only seemed intensify her reaction. With tears in my eyes and pain in my heart, I watched Jaimie beat her head into the couch cushion repeatedly. Through Jaimie's muffled sobbing, she uttered a faint, "Mama...help me."

That was a regular scene in our house. Some days there were many incidents per day, with each meltdown lasting hours at a time, and the meltdowns grew as Jaimie did.

I actually knew that Jaimie was different from other children 3 months into her life. While other wee ones were comforted by touching, hugs, and kisses,

Jaimie was the opposite. When we picked her up, she struggled and screamed but calmed down somewhat once put back down. As she grew, so did her behaviour: she angered quickly, adjusted slowly to change, startled easily, rarely smiled or laughed, and was so afraid of other people I'd often spend an entire visit or shopping trip with her clinging desperately to me. A simple "hi there" from someone sent her immediately into tears. On top of this, she had terrible fits, similar to or even worse than what's been described, where she would purposely hurt herself in some way (such as head banging, biting herself, other people or objects, scratching herself or pulling out her hair) until she calmed down.

When Jaimie's behaviour worsened to the point that she would be having fits for hours at a time every day, I finally sought answers from Jaimie's pediatrician. Jaimie sat on my lap facing me, wearing only her diaper, and screeching at the top of her lungs. She refused to let the pediatrician touch her, which had made it rather difficult to carry out the examination. "She will grow out of this soon enough," said the pediatrician at the end of each visit, "she's just spirited." "Spirited!"; "Just being a toddler." I heard these words often and I found it frustrating that others offered their opinions so freely when they had no idea what we were going through. Contrary to what people thought they were seeing, Jaimie's screaming fits were not reactions to not getting her own way; but more an effort to communicate something was amiss in her environment that she could not deal with.



**About the author – Chynna Laird**, is a psychology student, freelance writer, and author living in Edmonton, Alberta with her three daughters; Jaimie (six), Jordhan (four), and baby Sophie (almost one) and baby boy, Xander (two). Her passion is helping children and families living with sensory processing challenges and other special needs. Chynna is pictured here with her daughter, Jaimie, who has sensory processing challenges, and is the focus of this article.

Jaimie, I learned, was unable to cope with her external environment and could not verbalize what she felt because she was unsure herself and she was scared. Adding to her frustration was her total dislike of being held, comforted, or otherwise touched. Jaimie was trapped in a constant struggle between wanting to be comforted and touched, but her body being utterly repulsed by the sense of touch.

We were directed to an Early Intervention Program. After only one home visit, an occupational therapist was able to identify that Jaimie's behaviour was related to sensory processing challenges.

"Most of us have the ability to tune things out in our environment so we aren't bombarded with sensory information," the occupational therapist said. "We don't listen to the squeaks, creaks, bumps or other weird noises going on everywhere around us; we don't smell every stinky or nice smell in our house, and we try to focus on what is in front of us so we aren't distracted. Kids like Jaimie are incapable of this filtering ability."

With this realization I knew Jaimie heard every sound, smelled every smell, and saw everything, because she was unable to tune anything out. Imagine how terrifying it would be to have to take in all that information but not know what to do with it! I get upset if the phone rings, my youngest daughter Jordhan is screaming, and the microwave all go off at the same time. No wonder Jaimie had such terrible breakdowns.

To be honest, I was very nervous about allowing an "outsider" to interact with Jaimie. It could take up to a week for her to get over the stimulation from her therapy sessions and there were so many times I just wanted to throw in the towel, screaming, "Enough! I can't stand watching my baby screaming and crying. I'll take care of her on my own like I always have." But, in my heart, I knew this was not true.

What I had been doing before the occupational therapist's arrival was not helping. Jaimie needed her system to experience sensations so she would learn how to cope in the outside world. What I had always done was to allow Jaimie to avoid what bothered her. How was that going to help her learn how to function?

The occupational therapist's method of addressing sensory processing challenges (teaching children how to cope with the information their brains are unable to process) was to work within a child's comfort zone and include the child's interests. The occupational therapist used Jaimie's love of drawing, reading, and crafting in the therapy process and also understood Jaimie's rigidity to changes in her rou-

tine and her immense struggles with transition. For example, when we moved from an apartment to a two-bedroom townhouse, Jaimie not only needed to

*"What I had been doing before the occupational therapist's arrival was not helping."*

have her room set up exactly the same but it took her nearly a year just to get used to our new place. She became so anxious if I'd simply moved things around to clean around them, thinking we were moving again, she'd melt down.

Jaimie had to slowly get used to someone working with her so we chose to have therapy at home. The occupational therapist brought a new, fun, sensory-rich craft (Jaimie's favorite activity) and a book to read afterwards (the best activity for calming her) for each visit.

The occupational therapist also worked with Jaimie's need for consistency and routine by coming on the same day every week, at the same time, with the same over-sized bag Jaimie knew was filled with fun stuff to do. The plan was brilliant. In addition to Jaimie's sensory processing challenges, which were quite severe in her younger years, she also suffered with high anxiety. So the activities the occupational therapist provided kept both of these struggles in mind: stimulating her sensory systems but also providing Jaimie options to help calm her anxiety to reduce a meltdown.

Keeping in mind Jaimie's love of arts and crafts, some activities the occupational therapist provided were:

- Sensory rich crafts, such as cut and paste with various textured materials, pompoms, feathers, sparkles, scented markers, and other objects for her to "feel." Jaimie was, and still is, highly tactile-sensitive and avoids many sensations.
- Scratch and Sniff books. Jaimie didn't always like these books, depending on the smell. She's also highly olfactory-sensitive.
- Scented and non-scented *PlayDoh* to stimulate Jaimie's fine motor skills, tactile and olfactory senses. The occupational therapist also used this as a way to help Jaimie to "squeeze" out her anxiety/frustration.
- Finger crayons (crayons that slip onto the ends of her fingers). Jaimie didn't like anything on her hands or fingers but tried them occasionally.
- "Squishing" Jaimie. The occupational therapist sat on the couch with Jaimie behind her then squished into her. This sort of deep pressure made Jaimie ac-

tually feel better when she was up. We still use this method.

- Crazy dancing, rolling on a yoga ball, jumping on a mini trampoline or air mattress, run around the room, or spin. These are all activities Jaimie loved but aren't always safe or appropriate to do. The occupational therapist used these activities after Jaimie did the more sensory stimulating activities to release her anxiety. This taught Jaimie to have control over her reactions, rather than lash out, hurt herself, or meltdown.
- Chewy tubes, straws, and crunchy snacks when Jaimie sought such stimulation (Jaimie tended to avoid sensations, but did occasionally seek oral and olfactory sensations).
- Teaching Jaimie to say things like, "Help, please," "Too close," or "Yuck smell" so we'd understand when something around her bothered her. It helped us to stay one step ahead of her meltdowns.
- Strategies to help Jaimie through necessary hygiene activities, such as teeth or hair brushing, bathtime, and getting dressed. Allowing Jaimie to help choose her clothes, or getting her to brush her own teeth, seemed to make her feel better because the task was then being done in a way with which she was comfortable.

As much help as the occupational therapist was by helping us understand Jaimie's struggles, teaching us better ways of coping with these struggles, being a strong resource of information, and providing connections to other services Jaimie desperately needed, we

had to end sessions after about a year. Jaimie progressed in her therapy, but then regressed back to a point she was at before beginning with occupational therapy (regression in therapy is something we still struggle with to this day).

Despite having to end occupational therapy sessions, however, our family became much more enriched having had her there for a little while. Without the occupational therapist we would never have gotten to where we are today in terms of resources, coping methods, and strength. And we would still have a little girl terrified of what waited for her outside our front door, with no desire to find out. Jaimie may still be anxious and nervous about the new, and still easily overly stimulated, but she tries and I am grateful to the occupational therapist for that. The experience makes me less nervous for the next school year, when occupational therapists will be working with Jaimie, and most likely, for the rest of her young life. At this stage, it's still tiring, frustrating, and a daily struggle coping with Jaimie's sensory processing challenges, but small positive changes have shone through. Near Christmas of 2007, I received the best present from Jaimie I'd ever had or will ever receive: She ran across the room, wrapped her tiny arms around my neck and gave me a hug (a real hug, not just merely placing her head on me and saying, "Hug!") and said, "I love you, Mama". I can count on one hand how many times she's allowed herself to do that, but I hold onto that one hug, knowing what we are doing is reaching her, even if we can't always see it. It gives me hope.



# Being sensational: A clinician's perspective



Chris Everdell



**About the author –**  
**Chris Everdell**, BSc, OT Reg(ON), is an occupational therapist who has been working with children for 26 years, with the last 15 in private practice. In her experience, each of us faces sensory challenges on a daily basis and our enjoyment of life is dependent on the little coping strategies we develop. She enjoys exploring sensation from a clinical perspective and passing on these strategies to anyone (friends, family, strangers...you name it!) who will listen.

I am an occupational therapist, I am married, I have a family, I have two dogs, I am a Canadian. I look and act “normal”. But perfume makes me sick, loud sounds distract me, and quick movement makes me dizzy. These are some of the many little issues that drive me crazy on any given day. Most people think I am just “quirky” because my little issues don’t stop me from leading a very full and joyful life. That’s what I used to think too. I couldn’t understand why I couldn’t handle something when the people around me could. I can’t begin to describe how I feel when I am eating a really lovely meal, in a really lovely restaurant, with my really lovely husband, and all of a sudden I am enveloped in a cloud of another person’s perfume. I can no longer enjoy the meal, the environ-

ment, or the company. I am an adult with bags full of knowledge about sensory processing and there I sit barely able to cope. Well, I do cope. This is my story about me, and about the children I work with.

I often cope in ways that many people might find embarrassing (you can speak to my daughter about that) or silly, or way too easy. “What do you mean that chewing gum helps you feel calmer? If it’s therapy shouldn’t it be more scientific and way more expensive?” When I go to the movie theatre, I bring a vanilla “Lip Smacker” to rub around my nostrils (then all I smell is the vanilla which is a scent that I like and can tolerate) and a scarf (which I wrap around my head) or ear plugs so that the sound of people chewing popcorn doesn’t distract me from Daniel Craig (aka

James Bond). I sit near the back so that the fast visual input doesn’t make me sick to my stomach and I chew gum. I enjoy the movie, I feel okay, and I haven’t really bothered anyone else with my coping techniques.

This stuff works for me. I don’t want my poor processing skills to stop me from enjoying life. Convincing other people that my strategies are okay and that they are part of me is the challenge. Without these strategies I would become very sick. It is devastating to my health to let these sensations take over my body. On the outside, people see a person who doesn’t look like she has anything wrong with her. So do I really need all of these relatively simple solutions and strategies? You bet I do! Thank goodness I spend my days working in a therapy clinic that focuses on such things. It is where I belong: working with children who are wonderful human beings but who need some help tolerating the world around them and convincing the world that they need some help with it. They are not spoiled children whose parents have let behaviours get out of hand, which is often implied by those who don’t understand sensory processing, especially when it isn’t working well. These children often don’t look any different from their peers, but they work so hard trying to be like their peers that the adult perception is one of poor behaviour.

As an occupational therapist working in pediatrics, I have taken the time and had the ambition to support the development of my knowledge of sensory processing. When I started working in pediatrics 25 years ago, I knew I was missing something when all I did was gross and fine motor assessments. Since coming to the realization that sensory processing could fill in that missing piece of the puzzle, I have grown both personally and professionally.

I am passionate about the children I work with and even more so for the area in which I have developed extensive knowledge and skills: sensory processing. I love sharing my own knowledge but sometimes I wish I could just hook up a tube to the parent of a client and transfer what I know right into their brain. Unfortunately, it doesn’t work that way. I am continually astounded by, and celebrate, the amount of new information bombarding us with regard to sensory

processing. Fifteen years ago there were very few books available, especially in user-friendly versions for parents and teachers. Now, with easy access to the internet and so many great books available, parents, caregivers, and teachers can find some answers to their questions and some strategies that might assist them. Leaders in the area of sensory processing such as Winnie Dunn, Lucy Miller, and Carol Stock Kranowitz have made life so much easier for all of us.

Though we don't realize we are discussing them, sensory topics are common conversation topics: "Hey, can you smell that wonderful lasagna", "wow, those tarts look fabulous", "I love to listen to this music", "it feels so cold in here", "did you enjoy the spectacular spring weather today?" Sensation is all around us, every moment of the day, but few of us choose to pay attention to it or examine how it affects us from moment to moment.

In my job I spend a lot of time analyzing sensations and trying to figure out why someone (a child in particular) reacts the way he/she does. I spend time

*"I love watching how sensation affects how we behave or respond to different situations."*

reading and attending conferences to learn more, but the best learning for me occurs with the children around me. They fascinate me, they have so many brave and cool ideas of what to do with their bodies. All of what appear to be my great ideas really come from them. I just put them into a user-friendly format for their parents and those adults around them who are struggling with the "whys" of the behaviour. My standard line in order to help people understand some of the strategies used is that chewing gum is just as important to help me pay attention as my glasses are to help me see or a hearing aid that helps my grandmother hear.

I spend a lot of time educating those around me, whether it is at work, a family gathering, or a social event. I love watching how sensation affects how we behave or respond to different situations. I recently visited my brother and his partner in Virginia. We spent an evening talking about their sensory processing, especially with regard to food and smells. It was fun, interesting, and they had so much to say about it.

One of my big goals in dealing with adults who help the children I work with is to educate them about their own bodies. I feel that without some knowledge of their own sensory processing it is very difficult to try and help a child. It's sort of like the flight attendant telling you that you "have to put on

your own oxygen mask before you can help someone beside you". It is vital that you have an understanding of your own body (what makes you feel good and keep feeling good, what allows you to learn, work, and have fun) before you can ever become the sensory detective for a child or anyone else. We all process sensation differently and that processing varies from moment to moment throughout the day. Sometimes it's great, sometimes it's not. One day your sensory processing state will allow you to have a good day, the next it might be a bad day. Having an understanding of the process is necessary in order to help either yourself or someone else. I feel driven to help people understand that there may not always be an immediate answer or a clear strategy but if you understand why and how sensory processing works then you will be that much closer to finding it.

I recently presented a workshop to parents, teachers, and therapists. My goal was to teach them about their own bodies while engaging them in sensation in order to maximize their learning. We had fidgets, seat cushions, gum, movement breaks, and visual, auditory, and participatory activities. The time was spent examining sensation and the individual and diverse reactions and coping strategies. Feedback from this workshop was overwhelmingly positive. Many people felt that they had a better understanding of the sensations they process, the absence of a real "normal", and how to become a detective when looking at sensation.

When I see a child I always consider: (1) If the behaviour/reaction/response to the sensation is safe and (2) If it is socially appropriate to the situation. If not, then I will work with the child, the parents, and the other adults involved (for example, at school) to

*"We all process sensation differently and that processing varies from moment to moment throughout the day. Sometimes it's great, sometimes it's not."*

find an alternate form of the sensation that meets the above criteria. This is no easy job. Lots of resistance is met along the way from all involved. Change is not easy.

Think of a child who can't tolerate floral scents living with a parent who wears scented body lotions and perfumes daily. Sounds like a simple change. Believe it or not, this type of change is one of the hardest to sort out and to deal with. First of all, determining what is really bothering the child is a challenge. Then asking the parent to change what she has been doing as part of her daily routine is the second challenge.

The parent might need the scented products to help her be alert and feeling in a “just right state”. The child becomes extremely hyperactive around the floral scents and may go into a meltdown. How do you meet the sensory needs of both individuals? It takes lots of experimenting, a willingness to change, and never giving up.

Since there is no specific recipe card for dealing with sensory processing difference and often what you try one day may not work the next, helping can become quite frustrating. Convincing caregivers that the child’s actions are not purely behaviour-based, or actions of a spoiled child, is another barrier. The fact that many of the strategies don’t require expensive therapy equipment tends to make people put less faith or value in them. Follow-through can often be impeded by these attitudes. I often receive comments from adults that if all it takes is a wiggle cushion then it can’t really be that serious and the child just needs to put up with it. This can be very discouraging. When this happens I start educating again. I point out what makes good sensory processing happen and that it is a 24/7 process for everybody, everywhere. Just because it doesn’t look broken (like a cast on a broken arm) doesn’t mean that it’s working.

Sensory processing should be a standard area of learning within all occupational therapy programs. It affects every age group and every type of person. How can we ignore it? I encourage all therapists to read, attend a conference, or delve into whatever type of education that will help you learn about sensory processing. It affects us all. It is with us from moment to moment. We can’t ignore it anywhere or anytime, in any walk of life.



# Promoting inclusive social environments using a sensory processing simulation

Pamela Wener, Lisa Diamond-Burchuk, Jacqui Ripat, Lianne Belton, and Dorothy Schwab

## About the authors –

**Pamela Wener**, M.Ed., OT Reg (MB) is an Associate Professor in the Department of Occupational Therapy, University of Manitoba, Winnipeg, Manitoba, pwener@cc.umanitoba.ca.

**Lisa Diamond-Burchuk**, BMR OT, SI Certified, OT Reg. (MB), is an instructor in the Department of Occupational Therapy, University of Manitoba, Winnipeg, Manitoba and a staff occupational therapist at the Health Sciences Centre, Winnipeg Manitoba, diamond@cc.umanitoba.ca.

**Jacqui Ripat** MSc, OT Reg. (MB) is an Associate Professor in the Department of Occupational Therapy, Winnipeg, Manitoba, ripatj@cc.umanitoba.ca

**Lianne Belton**, BMR OT, RDI Program Certified Consultant, OT Reg. (MB), is an occupational therapist working at the Rehabilitation Centre for Children, Winnipeg Manitoba, lianneb@rccinc.ca

**Dorothy Schwab**, BOT, OT Reg (MB) is an occupational therapist working with the Clinic for Alcohol and Drug Affected Children at Children's Hospital and School Therapy Services.

Addressing issues in our client's social, physical, and institutional environment to promote occupational performance and engagement is well established as an essential area of occupational therapy practice. As agents of change and experts of enabling occupations, occupational therapists strive to create healthy environments in which our clients may participate (CAOT, 2007; Townsend & Polatajko, 2007). For children, the school environment includes the classroom (lights, noise, temperature, etc.), schedule, activities, rules, policies, teachers, and peers. Although clinicians are frequently involved in advocating for changes to the physical and organizational environment to support learning for children with sensory processing differences, it is equally imperative to address the social environment.

Occupational therapists have a role in addressing and modifying the social environment and hold a particular responsibility to address the exclusionary attitudes of society, an

issue often disregarded by professionals (Hammell, 2007). Children with disabilities may experience exclusionary attitudes from their peers that can contribute to the limitation of their choice of occupations. However, young children develop more positive attitudes towards peers with disabilities when they gain knowledge of the disability (Diamond &

Huang, 2005). Through education, children may better understand the experience of being disabled and this may promote development of positive attitudes and behaviours, ultimately leading to more inclusive social environments.

Occupational therapists educate clients using experiential learning where clients learn through doing (Townsend & Polatajko, 2007). Experiential learning involves the learner in activities and is different from didactic learning, which involves learners as more passive recipients of information (Gentry, 1990). Simulation, a situation meant to imitate a real process, is a form of experiential learning that is widely used in occupational therapy (Table 1). Children who experience a first-hand simulation exposing them to the difficulties experienced by their peers with disabilities may develop a more positive attitude towards inclusion (Hutzler, Fliess-Douer, Avraham, Reiter, & Talmor, 2007). Additionally, individuals who participate in simulation activities are able to actively empathize with the experiences that they engage, observe the outcome, and recognize the implications of the experience (Ravenscroft, 1998).

Table 1

Simulations used in occupational therapy	Purpose
Work and home environments	Client or occupational therapy student assessment and education
<i>The Hearing Voices Workshop</i> (Deegan, 1987)	To provide a subjective experience of auditory hallucinations
<i>The Prevent Alcohol Risk Related Trauma in Youth (P.A.R.T.Y.)</i> (Sunnybrook Woman's, 1986)	Disability due to impaired driving prevention

## Reframing sensory processing differences

Dunn (1999) describes a continuum of sensory responsiveness, where the nervous system of individuals on one end of the continuum require excessive sensory input in order to be activated (high threshold), while those on the other end of the continuum

respond too easily and frequently to stimuli (low threshold). Occupational therapists often identify sensory processing differences in children diagnosed with autism spectrum disorder, children exposed to drugs and alcohol while in utero, and in children with attention deficit hyperactivity disorder, learning disabilities, and/or cognitive impairments. Children with sensory processing differences may experience difficulty with tasks requiring attention and concentration, display poor self control, low self esteem, and be challenged by handwriting and other academic tasks that require motor planning or coordination. These issues may contribute to ineffective interactions within the learning and social environments (Ayles, 1979).

Schwab (n.d.) proposed a process of *reframing* that involves shifting the focus from the child with the sensory processing differences onto the child's environment. By reframing the focus onto the environment, caregivers and others in the child's social environment (such as the child's peers and youth leaders) are able to create environments that meet the child's needs. However, in order for people within the social environments of children with sensory processing differences to provide supportive environments, they must have an appreciation of the sensory processing experience of these children. Thus, a workshop that included simulation was created.

### The sensory processing workshop

A sensory processing workshop, intended to contribute to the development of supportive school and recreational environments, was developed and has been successfully conducted by several occupational therapists over the past 15 years. The workshop includes three components: a didactic portion, a simulation experience, and a debriefing session.

#### a. The presentation

The didactic component provides a basic education in sensory processing and includes an overview of sensory input through the visual, olfactory, gustatory, auditory, tactile, kinesthetic, and proprioceptive systems. The presentation emphasizes the process through which incoming sensory information is sorted, interpreted, and responded to, by the central nervous system (CNS). The presenters highlight how the misinterpretation of sensory information by an impaired CNS may lead to a response or behaviour that seems inappropriate to others in the environment (Schwab, n.d.). Examples and case studies are often used to illustrate this point (Example One).

#### Example One

**Peter is a six year old child who has difficulty recognizing the intensity of tactile input (over responsiveness). Wanting to get his attention, Jason reaches out and places a hand on his back. Peter's misinterprets this touch as a rough push. Peter responds by pushing Jason back.**

#### b. The simulation

Building on the work of Belton (personal communication, March 20, 2009), the sensory simulation component of the workshops was originally created by Schwab in the 1980s and has since been modified and used by several of the authors. The simulation portion begins by asking participants to complete the Sensory Preferences checklist (Williams & Shellenberger, 1996). Completion of this checklist provides a bridge to the presentation component in which participants recognize their own sensory preferences. Following this activity, each participant receives a variety of items to wear or use while performing math or spelling tasks. The simulation provides participants with an opportunity to experience attempting to complete an academic task while responding to sensory information that is distracting, confusing, or inaccurate. Other examples of simulation activities, and the sensory response that the activity is intended to simulate, are presented in Table 2.

Table 2

Examples of simulation activities	Simulation
Tissue paper hats that surround the ears	Auditory over-responsiveness
Pieces of tinsel placed around the neck and ankles	Tactile over-responsiveness
Mitts used on the hand for writing	Tactile under-responsiveness
Light pencil crayons used on dark construction paper for writing	Tactile under-responsiveness and diminished kinaesthetic awareness
Perfume infused paper	Olfactory over-responsiveness
Noise such as a radio playing static loudly in the background	Auditory over-responsiveness



Participants in a sensory processing workshop take a math test while experiencing sensory under and over stimulation.

### c. The debrief

The debriefing component of the workshop aims to highlight the insights gained through the workshop. Participants discuss their affective reaction to the simulation experience and are asked to reflect on their past reactions to observed behaviours in children with sensory processing differences, and how the awareness gained through the workshop may impact their future interactions with these children.

### Conclusion

When peers and teachers develop increased empathy and inclusionary attitudes, it is likely that they will behave in a way that will result in supportive environments for individuals with sensory processing differences. With knowledge of sensory processing theory, an understanding of the occupation-based issues experienced by children with sensory processing differences, and an emphasis on creating healthy environments to promote full participation, occupational therapists are well-positioned to engage others in experiential learning experiences. By facilitating

simulation experiences to increase awareness and empathy within the social and educational environment of the child with sensory processing differences as described in this paper, or developing similar simulation experiences, occupational therapists can promote and contribute to the development of these supportive and enabling environments.

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# The sensory side of Tourette's disorder



Robin Jewers



## About the author –

**Robin Jewers, OT Reg (MB)**, is the occupational therapist on the Tourette Syndrome Service team, Child and Adolescent Mental Health Program, St. Boniface General Hospital, Winnipeg, Manitoba. She can be reached at [rjewers@sbg.mb.ca](mailto:rjewers@sbg.mb.ca).

## *“David, Please get your boots on!”*

When I first met David, an 8-year-old boy, and his mother Shirley, I was struck by David's many motor and vocal tics as well as his hyperactivity. Along with symptoms suggestive of Tourette's disorder (TD) and attention deficit hyperactivity disorder (ADHD), Shirley complained of David's extreme reactions to particular sensory input. She described daily struggles about getting dressed that included David complaining that his “socks, pants, and tops didn't feel right”. During the winter months,

David and Shirley's morning routine always included a struggle that centred on David's discomfort with wearing winter boots, a necessity in Winnipeg! For about an hour, David struggled to feel comfortable, moving his feet in and out of his boots repeatedly. Finally, when he kept his boots on, David would stomp around the apartment until he was satisfied with how the boots felt. This “boot ritual” would often make him late for school, disturb the neighbours, and create family tension.

## What is Tourette's disorder?

TD is a childhood-onset neurodevelopmental disorder characterized by multiple motor and vocal tics. To strictly meet the diagnostic criteria, an individual must demonstrate at least two motor tics and at least one vocal tic. The onset of these symptoms must occur before 18 years of age and must have lasted at least one year (American Psychiatric Association, 1994). TD is commonly associated with other disorders, most frequently ADHD (62% co-morbidity), learning disorders (LD) (26%) and obsessive compulsive disorder (OCD) (20%) (Tourette Syndrome Foundation of Canada, 2006). Once thought to be rare, the incidence of TD is

now felt to be one in every 100-200 people (Tourette Syndrome Foundation of Canada). This article will provide information about my initial assessment of David, the questions his sensory issues, and those of many other children with TD, raised for me, and some answers I have found.

## Learning more about David

As the occupational therapist on a multidisciplinary team working with children with TD, I gathered collateral information from David's school about his overall performance in that setting and interviewed David and Shirley to identify and prioritize occupational performance issues. I then asked Shirley to complete a Sensory Profile Caregiver Questionnaire (Dunn, 1999) to obtain a clearer understanding of his sensory processing patterns. Information from all sources made it clear that David's unique combination of sensory avoiding and sensory seeking behaviours were not just interfering with dressing, but with learning new motor skills (riding a bike), focusing in the classroom, and controlling his behaviour in stimulating environments like the lunch room. Also of note were his tics, in particular his eye-blinking tic, which increased in frequency when in emotionally and environmentally stimulating environments.

Persistent questions nagged me during my involvement with David and the many other clients just like him: Are there unique sensory differences in individuals with TD? If sensory differences exist, are they related to TD specifically or are they more related to the associated disorders that commonly accompany TD? What role do sensory issues play, if any, in the expression of tics?

## What the literature says about sensory issues and TD

A review of the literature reveals a mix of clinical accounts and neurological evidence for atypical sensory experiences in individuals with TD. The most frequent clinical accounts relate to sensory urges that precede tics. Many individuals with TD, typically over the age of ten years old, describe an odd sensory feeling that compels them to complete a tic. They often describe the tic as a voluntary response to an involuntary sensa-

tion, like an itch that needs to be scratched (Kwak, Dat Vuong, & Jankovic, 2003; Leckman & Cohen, 1999). Other accounts from individuals with TD are more related to being sensitive to external sensory information. Some report unconsciously copying the movements (echopraxia) or speech (echolalia) of others. There are also clinical accounts of both children and adults with TD being more sensitive to, or distressed by, certain clothing items (Leckman & Cohen; Waltz, 2001) or who report that their tics are triggered by certain sounds or images (Home Box Office, Inc and Tourette Syndrome Association, Inc. 2005)

Literature regarding the neurology of TD presents an interesting picture. Studies have indicated that there are no differences in sensory functions in individuals with tics upon neurological examination (Abbruzze & Berardelli, 2003). However, there is consistent evidence of subtle basal ganglia abnormalities and disturbances in neural pathways between the basal ganglia and other parts of the brain involved in the regulation of movement. (Abbruzze & Berardelli; Albin & Mink, 2006; Leckmann & Cohen, 1999). There is also recent evidence of cortical thinning in the sensorimotor cortices of children with TD (Sowell et al., 2008). It is thought that these brain differences contribute to impaired motor control as well as the sensory urges that commonly precede tics (Nowak et al., 2005; Sowell et al.).

### Sensory issues in disorders related to TD

A review of sensory issues related to the top three conditions co-morbid with TD (ADHD, LD, and OCD) indicates one or more of the conditions may, indeed, be contributing to the sensory picture of individuals with TD plus one or more associated conditions (TD+). Growing evidence demonstrates a number of atypical sensory responsiveness in children with ADHD (Dunn & Bennett, 2002; Mangeot et al., 2001; Parush et al., 2007; Yochman, Parush, & Ornoy, 2004). There are also an abundance of studies in the LD field suggesting differences in visual, tactile, and auditory processing (Hulslander et al., 2004). Most recently, sensory intolerance has been identified as the driving behaviour behind at least a subset of children diagnosed with OCD (Hazen et al., 2008).

### Searching for more answers

To clarify and advance the understanding of sensory issues in children diagnosed with TD, I undertook to examine sensory processing patterns of 75 participants diagnosed with TD and TD plus ADHD. Preliminary results suggest that children with TD do indeed dem-

onstrate atypical sensory responses that are magnified with the presence of ADHD. A forthcoming manuscript will fully describe the findings of this research and implications for occupational therapy.

### Conclusion

Through my clinical and scientific journey, I have been led to believe that sensory issues do affect the behaviour of individuals diagnosed with TD. Assessment of sensory processing differences should be a standard component of clinical practice. Occupational therapy intervention aimed at modulating differences in sensory responsiveness in children like David could potentially decrease tic expression and help resolve disruptive behaviours like “the battle of the boots”. Perhaps my journey has just begun.

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# Sensory processing and sleep challenges in children with fetal alcohol spectrum disorder

Brenda Fjeldsted and Ana Hanlon-Dearman



**About the author – Brenda Fjeldsted, BOT, Dip. OT, OT Reg (MB)** is a pediatric occupational therapist at Children’s Hospital in Winnipeg, Manitoba. Her experience includes providing services to children with a variety of occupational performance challenges including neurodevelopmental, musculoskeletal, and prenatal alcohol and substance exposure. She is currently a team member of the Clinic for Alcohol and Drug Exposed Children. She is also a co-developer of “Keeping on Track”, a board game adjunct to the Alert Program™. Brenda can be reached at [bfjeldsted@hsc.mb.ca](mailto:bfjeldsted@hsc.mb.ca)

Fetal alcohol spectrum disorder (FASD) is a lifelong disability resulting from confirmed maternal alcohol use during pregnancy. Persons affected can exhibit a wide range of features from severe growth restriction, mental retardation, birth defects, and characteristic dysmorphic facial features, to normal growth, facial features, and intellectual abilities (Chudley et al., 2005). There are three diagnoses within the spectrum: Fetal Alcohol Syndrome (FAS), partial FAS, and Alcohol Related Neurodevelopmental Disorder (ARND). There are an estimated 9 in 1000 babies born in Canada affected by the disability (Health Canada, 2003). While there is no cure, with the right supports, approaches, and services, many people with FASD can lead happy and productive lives (Chudley et al., 2005).

## FASD and occupational therapy

Prenatal alcohol exposure adversely affects neurodevelopmental functioning. The *Canadian Diagnostic Guidelines* require evidence of impairment in at least three central nervous system domains, which include hard and soft neurological signs (including sensory motor skills), brain structure, cognition, communication, academic achievement, memory, executive functioning, attention, and social adaptive behaviour. Occupational therapists are members of multidisciplinary FASD diagnostic teams across Canada, providing assessment of the sensory motor domain. Additionally, occupational therapists have expertise

in identification of occupational performance difficulties (productivity, leisure, self-care) in affected individuals and in the provision of client-centred intervention strategies.

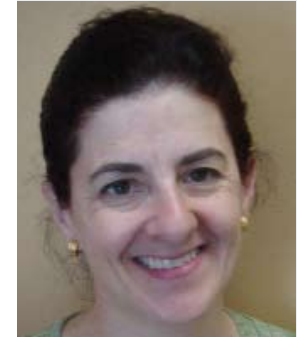
## Occupational therapy, sensory processing, and FASD

Sensory processing has been defined as the interaction between neurological processing of sensory input and behavioural responses (Dunn, 1999). Occupational therapists’ knowledge of sensory processing provides an intervention approach for those affected by FASD. Evidence of sensory processing dysfunction and FASD is becoming more apparent within the literature. Sensory processing differences were confirmed in a study of 100 children aged 3-10 years with FASD using the Sensory Profile for Children (Stade et al., 2006). Children with FASD were also found to have sensory processing deficits co-occurring with problem behaviours, suggesting that deficits in sensory processing may affect the ability of these children to respond adaptively to their environment (Franklin et al., 2008).

## Sleep and sensory processing in children exposed to alcohol

Individuals with FASD frequently have disrupted sleep-wake cycles (Streissguth, 1997). State regulation difficulties, including sleep characteristics, have been described in young children affected by exposure to alcohol (Hanlon-Dearman, 2003).

Sleep and sensory processing in children with FASD was examined in a pilot study conducted at the Clinic



**About the author – Dr. Ana Hanlon-Dearman, MD, MSc, FRCPC, FAAP, CBSM**, is a developmental paediatrician with the Clinic for Alcohol and Drug Exposed Children and the Child Development Clinic at Children’s Hospital in Winnipeg, Manitoba. She has completed her Master’s degree in Community Health Sciences on the sleep characteristics of young alcohol exposed children, and is also certified in Behavioral Sleep Medicine. Ana may be reached at [ahdearman@hsc.mb.ca](mailto:ahdearman@hsc.mb.ca)

for Alcohol and Drug Exposed Children at Children's Hospital in Winnipeg. This study hypothesized that sleep fragmentation would correlate with sensory processing disturbances in young children with confirmed prenatal alcohol exposure/FASD. Data were collected from 20 children ages 0-36 months with confirmed alcohol exposure. Caregivers were provided with the Brief Infant Sleep Questionnaire (BISQ) (Sadeh, 2004) and the Infant/Toddler Sensory Profile Caregiver Questionnaire (Dunn, 2002).

Areas of sensory processing differences identified by the Infant/Toddler Sensory Profile (auditory, visual, tactile, vestibular, and oral sensory processing) were tested for correlation using Spearman's rank correlation with sleep measures identified on the BISQ (nocturnal sleep duration, daytime sleep duration, sleep-onset time, settling time, night waking, nocturnal wakefulness).

Results of this study found significant correlations between:

- total daytime sleep and sensation seeking (p=0.0103)
- night wakefulness and sensation avoiding (p=0.0421)
- night wakefulness and oral sensory processing (p=0.0494)

This pilot study is the first work to positively correlate sensory processing differences in young children affected by exposure to alcohol with their sleep patterns. The occupational performance of sleep is impacted by these sensory processing differences.

The children who slept less during the day were more active and sensation seeking, likely working actively to meet high neurological thresholds. Fidgeting, rubbing/exploring objects, and chewing on objects increases the sensory input they are seeking. Dunn (1999) describes sensation seekers as appearing excitable or seeming to lack consideration for safety while playing, commonly described features in young children with FASD.

The children who were awake more in the night were avoidant of sensory stimuli, likely having low sensory thresholds and working actively to avoid overloading these thresholds. These children may be bothered by noises, lighting, and/or pyjama or blanket fabrics. According to Dunn (1999), sensation avoiders may engage in very disruptive behaviours to avoid situations that are uncomfortable or frightening. Conversely, they may be withdrawn in order to avoid uncomfortable sensory experiences. These children may create rituals to allow only familiar sensory experiences and become upset if these rituals are disrupted. This is often described by parents/caregivers attending our clinic.

## Sensory-based intervention strategies to enhance sleep in children with FASD

Addressing sleep difficulties in children with FASD begins with a multi-disciplinary evaluation of the child's sleep, including an occupational therapy evaluation of sensory processing. Sleep questionnaires, sleep logs, descriptions of the sleep environment, as well as social, developmental, and medical histories, are important in the assessment of sleep difficulties.

For children with FASD, determination of their sensory needs is part of the occupational therapy evaluation. Standardized sensory questionnaires such as the Infant/Toddler Sensory Profile and the Sensory Profile Caregiver Questionnaire provide important information regarding sensory processing when

*"This pilot study is the first work to positively correlate sensory processing differences in young children affected by exposure to alcohol with their sleep patterns."*

interpreted by the occupational therapist. In addition, careful observation by the occupational therapist of the child in the home or day care/school environments regarding sensory processing (for example, auditory, visual, tactile, vestibular, proprioceptive, olfactory, and oral sensory processing) is also crucial to designing the child's individualized intervention program.

In our experience, intervention may include cognitive strategies (including sleep hygiene, social stories), sensory-based strategies, and medical strategies (such as medication). Sensory-based strategies benefit from a consistent two to four week trial before determining their effectiveness. Maintenance of a sleep journal and log by parents or caregivers assists with analysis of the strategies.

Providing supportive environmental accommodations is necessary for interventions with individuals with FASD. This can include strategies such as altering the environment, reducing stimuli, manipulating the sensory input, and self-regulation strategies, such as outlined in the Alert Program™ (Williams & Schellenberger, 1996).

It has been said that; "A good night's sleep begins in the morning" (Kurchinka, 2006). A strategy for the alcohol-affected child may include the provision of a "sensory diet", for example, the therapeutic use of sensation via activities embedded in the daily routine (Bundy et al., 2002). The activity plan is constructed by the occupational therapist to meet the child's individual sensory needs and preferences. This may include the method for waking the child in the morning (lighting in the room, type of alarm, music). The sensory prop-

erties of the foods served for breakfast may also be important (texture, temperature, taste). The provision of regularly scheduled movement breaks within the child's day, including "heavy work" type activities such as lifting and pushing (Henry & Wheeler, 2001); and opportunities for vestibular input via linear swinging or rocking. Before bedtime, food with desired calming sensory properties may be part of the child's snack. Sucking through a straw, foods requiring "heavy work" for the mouth (such as chewing bagels) may be part of the sensory diet. A pictorial schedule may assist the child with FASD in understanding the sensory diet.

Sensory-based adaptations can also be made to the sleep environment. Visually the bedroom should be a calm, uncluttered, safety-proofed space, with dark or low lighting, and room darkening blinds. A slow moving, rhythmical, visual tool such as a fish tank can also be calming. In some instances having the child sleep in a small tent can help with limiting distracting visual stimuli. From an auditory perspective, a quiet room that is carpeted for noise absorption is generally preferred. Provision of "white noise" from a fan can be calming and can help to block out noises from the environment. Relaxing music, or music with a strong beat, has been recently reported to be helpful for falling asleep by students in an FASD classroom.

From a tactile perspective, pyjama materials must be considered. Often removing tags from clothing and softening new pyjamas by multiple washings can be helpful. Deep pressure, or a calming massage may provide needed tactile input. Some children with FASD engage in "picking behaviour" which may result in stuffed animals or mattresses being pulled apart. Provision of hand fidgets such as a stress ball or blankets with preferred fabric pulls, may help to meet the child's tactile needs. Sleeping bags or "nesting" with multiple stuffed animals may meet proprioceptive needs.

Slow rhythmical linear rocking, such as in a rocking chair, can be calming before bed and can address the child's vestibular processing needs. In general fast movements in all directions such as running or spinning may cause overstimulation and should be avoided before bedtime.

Finally, children with FASD often have a keen olfactory sense. It is necessary to be aware of all scents in the environment as they can be overwhelming (for example, laundry soap, fabric softener, toothpaste, body soap, or lotions). Determining which scents are calming for the child (for example; vanilla, banana, or lavender) can be helpful.

## Conclusion

Sleep difficulties in children with FASD are a common and important occupational performance difficulty that can impact daily functioning in multiple environments. The literature demonstrating evidence of sensory processing differences in this population is increasing. Occupational therapists' expertise in sensory processing evaluation and intervention places occupational therapy in the forefront for enhancing the lives of individuals with FASD.

## Acknowledgements

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## Announcing the 2009 CAOT Award Recipients

The CAOT awards celebrate contributions to the Association and to the profession of occupational therapy.

### **Muriel Driver Memorial Lectureship**

*The Muriel Driver Memorial Lectureship is the most prestigious award of the CAOT. This award is given to a CAOT individual or life member who has made a significant contribution to the profession through research, education, and the practice of occupational therapy.*

#### **Dr. Annette Majnemer, PhD, OT(c)**

Dr. Annette Majnemer is an internationally acclaimed researcher in childhood disability. During her 29 year career as an occupational therapist, she has distinguished herself as a clinician, an educator, and a researcher. Her research contributions to the advancement of the practice of occupational therapy and to the care of children has been supported by more than 3.5 million dollars in research funding. Her research accomplishments are recognized internationally with 127 publications and 229 conference or invited presentations. It is indeed rare to encounter an individual who presents such an outstanding ability to integrate scientific evidence into clinical practice and who is able to convey the depth and degree of that integration through teaching, graduate supervision, and evidence-based organizational change.

Despite Dr. Majnemer's graceful, unassuming style, she has achieved great stature, not only in her profession of occupational therapy for her research, education, and professional activities, but in the scientific and medical fields of neurology, neuroscience, and child development. Her contributions to the profession through her presentations, publications, teaching, and mentoring of young occupational therapy students and researchers continue to improve the understanding of health issues for children and change approaches to assessment and treatment of children with special needs in an evidence-based manner.

### **CAOT Fellowship Awards**

*The Fellowship award was established to recognize and honour outstanding contributions and service made by an occupational therapist over an extended period of time. Fellows of the CAOT are eligible to use the credential FCAOT.*

#### **Marilyn Conibear**

Marilyn began her career in 1958 being one of only six occupational therapists in Saskatchewan. She has held positions in hospitals and rehabilitation centres. She spent 19 years as the Associate Professor of Occupational Therapy for the University of Western Ontario and while on sabbatical she designed and created OTDBASE, an occupational therapy literature search service which she actively manages today. OTDBASE represents a pre-eminent contribution to the profession of occupational therapy worldwide as it allows users to find nearly 9000 articles specific to occupational therapy from over 20 global occupational therapy journals from all over the world.

#### **Dr. Joyce Magill Evans**

Joyce consistently provides leadership within the Department of Occupational Therapy, University of Alberta, the provincial occupational therapy organizations and the community. She developed the University Autism Research group in Edmonton, and was a founding member of the Perinatal Research Centre and of the Applied Developmental Neuroscience group. She is committed to collaborative multidisciplinary research and has also contributed to our understanding of the occupation of parenting and, in particular, fathering and its relationship to infant development.

#### **Dr. Juliette E. Cooper**

Juliette is Professor Emeritus in the School of Medical Rehabilitation, a Senior Scholar in the Office of the University Secretary, a Professor in the Department of Human Anatomy and Cell Science and in the Department of Community Health Sciences at the University of Manitoba. Juliette is a preeminent occupational therapy scholar in Manitoba and Canada, with a research program focused on the fields of work disability prevention, biomechanics, and kinematics. Her outstanding accomplishments in these fields of research have contributed greatly to the body of knowledge of occupational therapy over the years and she is recognized as a national occupational therapy leader in work disability prevention for her varied and ongoing contributions.

#### **Dr. Lori Letts**

Lori is Associate Professor within the School of Rehabilitation Science at McMaster University, and an extraordinary educator of student occupational therapists. Lori played a major role in the development of the *Canadian Person-Environment-Occupation Model*, a model for occupational therapy practice that is now used in education programs around the world. Over the past 20 years, Lori's achievements have centred on her innovative approaches to education and service, her development of concepts and tools to support evidenced based occupational therapy, and her research focused on the creation of supportive environments for older adults and chronic disease self-management within primary health care.

### Dr. Claire-Jehanne Dubouloz

Claire-Jehanne is professeure titulaire, Directrice de la clinique universitaire interprofessionnelle en soins de santé primaire de l'Université d'Ottawa. Combining a passion for occupational therapy, a commitment to excellent, innovative research and a dedication to students, faculty, staff, clinicians, and clients, Claire-Jehanne has had, and continues to have, an outstanding impact on the development and promotion of occupational therapy in Canada. Claire-Jehanne's commitment to transformative learning, evidence-based practice and active engagement in education is now also being applied to another area close to her heart – interprofessional learning.

### CAOT Award of Merit

*The Award of Merit is given to acknowledge significant contributions to the profession of occupational therapy by occupational therapists and non-occupational therapists.*

### Paulette Bourgeois

CAOT identified a need to develop a children's story book as a resource to introduce the role of occupational therapists to children in the primary or intermediate school age group. It was an obvious choice to ask Paulette to assist in the project with her experience as an occupational therapist and the world renowned children's author of the 'Franklin the Turtle' series.

Paulette rose to this challenge to research and write a 32 page children's book entitled, *You, Me and my OT*. To develop the story, Paulette spent time with a pediatric occupational therapist and her clients in both the home and school setting to gain substantive and procedural understanding of occupational therapy. This book will help occupational therapists in all settings to help their clients, families, and peers to better understand the role of occupational therapy as well as to educate the community in general.

### Kristi Bridgeman

Kristi was asked by CAOT to provide illustrations for *You, Me and my OT*. Kristi did intensive research into the profession of occupational therapy and worked closely with an advisory panel of occupational therapists seeking their input and advice to create delightful images to accompany the text written by Paulette Bourgeois. Kristi's images bring to life Emma, a feisty young girl with cerebral palsy who participates in everyday classroom occupations with the help of her occupational therapist Katie. The wonderfully detailed paintings in the book add delight and draw the reader into Emma's tale.

### British College of Occupational Therapists

The British College of Occupational Therapists was recognized for their agreement to provide members of the CAOT with online access to the *British Journal of Occupational Therapy* and offer members of the British College access to the *Canadian Journal of Occupational Therapy*. This "win-win" agreement promotes availability of research evidence for members of CAOT and the British College, in addition to broadening the audience of readers for both publications.

### Dr. Karen Jacobs

Karen worked to develop an agreement with the CAOT to provide *WORK: A Journal of Prevention, Assessment and Rehabilitation* as a benefit of membership in the Association. As a result of her efforts, CAOT members are able to access quality peer-reviewed manuscripts covering the entire scope of interdisciplinary and international work practice.

### Edrich Richards

Edrich recognized the important need for a national approach to injury prevention among the growing population of older drivers in Canada and the role of occupational therapists as leaders in advancing safety of older drivers. With his guidance and support, CAOT received funding from the Public Health Agency of Canada to work with other groups in Canada interested in older driver safety to develop and launch the *National Blueprint for Injury Prevention in Older Drivers*.

### Dr. Gail Whiteford

Gail has been an extraordinary world leader in advancing occupation-based occupational therapy and in developing the foundations for occupational science. Her many contributions to the development of occupational therapy publications such as, *Enabling Occupation II: Advancing an Occupational Therapy Vision of Health, Well-Being and Justice Through Occupation* have led to significant additions to Canadian practice and in assisting occupational therapy in gaining international recognition and praise. Her efforts in single-handedly organizing a book launch for *Enabling Occupation II*, in Australia, which attracted the honorable Canadian High Commissioner, were astounding. She is a central figure in making the new Canadian guidelines for *Enabling Occupation II*, a truly international document.

### CAOT Award for Innovative Practice

*The Award for Innovative Practice recognizes and honours the exceptional contributions of an individual occupational therapist who has shown innovation and leadership in clinical practice.*

### Adeena Wisenthal

Adeena is a registered occupational therapist and certified counsellor with over 20 years of experience in the fields of rehabilitation and mental health. She is the owner and operator of Ergo-Wise, a service that provides individuals with solutions to their personal and work-related needs. Ergo-Wise's mission is to prepare disability claimants for successful return to work; empower

clients to improve their functioning in their personal and work lives; and assist employers to promote wellness and to accommodate workers with disabilities. Adeena has demonstrated this commitment by working collaboratively with the City of Ottawa in an initiative to promote a healthy workforce and workplace, and most recently has collaborated extensively with CAOT in providing an exciting, evidence-based and informative multi-media presentation to the members of the Federal Public Service on the topic of *Fatigue in the Workplace*.

### **CAOT Student Award**

*Each year, CAOT provides a student award to a graduating student at each Canadian university who demonstrates consistent and exemplary knowledge of occupational therapy theory throughout the entire occupational therapy program.*

Claude Des Roches, University of Ottawa  
Kimberley Bourque, Dalhousie University  
Joanna Hulzenga, University of Alberta  
Jessica Dery, Université Laval  
Leanne Layzell, University of Toronto  
Jessica Malpage, University of Western Ontario

Charlène Rochefort-Allie, Université de Montréal  
Kara Waller, University of Manitoba  
Tracy McGillis, McMaster University  
Catherine Brandon, Queen's University  
Anita Petzhold, McGill University  
Naomi Goffman, University of British Columbia

### **CAOT Provincial/Territorial Citation Award**

*Citation Awards are given by CAOT in conjunction with provincial/territorial occupational therapy associations to acknowledge the contribution to the health and well-being of Canadians of an agency, program and/or individual within each province/territory who is not an occupational therapist.*

#### **The Multiple Sclerosis Society of Canada**

Provides services to clients that help them cope with the changes and adjustments that MS brings. They support them to remain physically active, and provide funding for equipment, such as computers and hand controls, that assist them in their daily living, productivity and social linkages.

#### **Karen Williams**

Karen has been head swim coach for the Manitoba Cerebral Palsy Sports Association for six years. As coach she has advocated for Swimmers with a Disability, facilitated inclusion at age group meets, and encouraged athlete independence.

#### **Eleanor Chornoboy**

Eleanor is the Director of Interdepartmental Initiatives with Family Services and Housing. She spearheaded the Children's Therapy Initiative, bringing together representatives of the government departments of Health & Healthy Living, Manitoba Education, Citizenship and Youth, Family Services and Housing, and Healthy Child Manitoba.

#### **Helen Henderson**

Helen is a dedicated and passionate freelance journalist whose work regularly appears in The Toronto Star. Over the years, Helen has informed her readers on a wide variety of topics related to disability which include: mental health, school inclusion, discrimination in existing legislation and policy, sport and disability, sexuality and disability, euthanasia, and a vast range of other issues.

#### **Millie Graham**

Millie has touched the lives of hundreds of people in Ontario, with her message to "live life from the heart". In 1992 at the age of 44, she sustained a massive stroke. Her descriptions of her experiences with occupational therapy are particularly inspiring. In September, 2008, she spoke to occupational therapy students at the University of Western Ontario during their "Welcome to the Profession" ceremony and in 2007 she delivered an inspirational key note address at the Ontario Society of Occupational Therapists conference. At both events the common reaction was "Now I know why I chose occupational therapy!"

#### **The Maintenance Departments within River Valley Health**

Recognized for their work with the occupational therapy departments and in promoting client centred therapy. On a regular basis, they problem solve with the occupational therapy staff to adapt, fabricate and fix anything. They welcome feedback, take pride in their work and demonstrate professionalism, patience and flexibility at all times.

#### **The Newfoundland and Labrador Housing Corporation**

Recognized for their commitment to integrating occupational therapy expertise into the renovation process to enable those with disabilities to maximize independence. The management and staff of Housing Corporation demonstrated their desire to best assist the residents of Newfoundland and Labrador by eagerly listening to the occupational therapy perspective on how to make the process of home renovations most effective.

#### **The Cycle to Walk Campaign and Ramesh Ferris**

Ramesh, a 28 year old polio survivor, founded The Cycle to Walk Campaign in 2002 after visiting India and witnessing the devastating reality of polio victims who did not have rehabilitative supports. The Cycle to Walk campaign started on April 12th, 2008, and ended on October 1st, 2008. In this time, Ramesh cycled 7,200 km from Victoria, British Columbia to Cape Spear, Newfoundland raising awareness and \$310,000 for polio.

## CAOT Certificate of Appreciation

*The diversity and success of CAOT activities rests largely on the work of a great number of active volunteers. Certificates of Appreciation are given to individuals who have volunteered their time to contribute to the ongoing work of the CAOT.*

Judy Asker	Joanne Hanlon	Inge Martin	Alison Sisson
Ginette Asselin	Family Headrick	Adele Martin	Sandi Spaulding
Catherine Backman	Alison Hendricks	Carol Miller	Deborah Stewart
Kim Baessler	Sandra Hobson	Lucy Miller	Melinda Suto
Margaret Barbour	Gavin Hood	Karen Mills	Corinne Tetrault
Cathy Bennett	Sébastien Jalbert	Celia Mirco	Marie Josée Therrien
Katie-Ann Berry	Shawn Jennings	Christine Mireault	Liz Townsend
Diana Bissett	Shone Joos	Melissa Nance	Kirsten Trenc
Tracy Cameron	Maureen Junk	Marianne Ondrus	Wendy Tse
Carolyn Chang	Lorian Kennedy	Allison Patterson	Josée Vallerand
Jo-Anne Chisholm	Carmen Kimoto	Joanie Pelletier	Krista Wade
Geneviève Denoury	Marita Kloseck	Jan Polgar	Heather White
Randy Dickinson	Michael Lee	Josephine Poon	Joelle Withers
Joelle Doucet	Diana Lee-Fong	Sharon Reashore	Darlene Wolfe
Joy Dunn	Denis-Guy Levasseur	Brenda Robinson	Tricia Woo
Mary Egan	Remy Lim	Margit Sampogna	Maureen Woodward
Mary Forham	Faith Malach	Wade Scoffin	Chelsey Wyrostok
Christiane Gauthier	Siri Marken	Vicky Scott	Cynthia Zhang
Leanne Godwin	Valérie Martel	Jing Shi	

## 2009 COTF Scholarship Competition Results

<b>Doctoral Scholarship</b> Sky Barbic and Jacque Ripat	<b>2008 COTF/SickKids Master's Scholarship</b> Nathalie Chokron Rochelle Stokes	<b>2009 Marita Dyrbye Mental Health Award</b> Cindy Malachowski
<b>Masters Scholarship</b> Dianna Robertson and Anita Petzold	<b>COTF 2008 Future Scholar Awards</b> University of Manitoba University of British Columbia McMaster University McGill University Dalhousie University University of Ottawa University of Toronto Queens University	<b>2009 COTF Critical Literature Review Award</b> Cary Brown
<b>Invacare Masters Scholarship</b> Amy Butler		<b>2009 JV Cook &amp; Associates Qualitative Research Grant</b> Rochelle Stokes Annie Carrier
<b>Thelma Cardwell Scholarship</b> Sandra Moll		<b>2008 Provincial Awards</b> NB Scholarship      Onslo Vincent BCSOT Award        Jeanne Yiu
<b>Janis Hines Memorial Fund Scholarship</b> Laura Dumas	<b>COTF 2008 Roulston innovation Award</b> McMaster University University of British Columbia McGill University University of Manitoba University of Ottawa University of Alberta Laval University	<b>2009 Provincial Awards</b> NSSOT Grant        Beckey Langille MSOT Grant         Ana Carvalho MSOT Grant         Corie Haslbec
<b>Community Rehabilitation Occupational Therapy Scholarship</b> Annie Carrier		
<b>Goldwin Howland Scholarship</b> Mary Forhan		
<b>COTF Co-Funded Awards:</b> 2008 COTF/CIHR-IA Studentship Neville Schepmyer	<b>2009 COTF Research Grants</b> Jacqueline Rousseau Leanne Leclair Heather Colquhuon	