Autism Laboratory

Mission
To enhance successful and meaningful participation in daily living, educational, social, and leisure activities for individuals with autism spectrum disorder (ASD) and their families by investigating the factors that impact participation, the occupational therapy interventions (OT) which aim to foster participation, and the types of physical and social environmental adaptations which lead to the best outcomes.

Areas of Inquiry

I. Factors that Impact Participation in ASD
   - Sensory features in ASD
   - Developing and applying measures of sensory integration

II. Evaluating Occupational Therapy Interventions for ASD
   - Investigating the effectiveness of Ayres Sensory Integration intervention
   - Evaluating recreational activities in relation to quality of life in persons with ASD (EuREKA Project)
   - Studying the impact of Coaching in Context for College Success (C+C Project)
   - Developing and studying the impact of caregiver education programs

III. Identifying Supportive Characteristics of Physical and social Environments
   - Environments to enhance quality of life in individuals with ASD
   - Impact of trauma on participation in for those living with ASD
   - Identifying positive environmental modifications which can facilitate participation in the community (SAFE: Sensory Aware and Friendly Environments)
   - Reconsidering the classroom for children with ASD through projects such as Innovative Design for Engaged Attention and Learning (IDEAL)

General Description of Student Activities
Students with an interest in ASD are invited to participate in the activities of the Autism Laboratory and choose an area of focus. Students will work under the guidance of the faculty researcher to complete activities and projects. Students must be highly motivated with strong academic achievement. All students, regardless of area of focus, will develop an understanding of autism and its unique features and considerations, and will complete directed readings to achieve minimum competencies in the field of autism.

Current Projects

Understanding Sensory Features in Autism (Dr. Schaaf; Dr. Krisa)
The goal of the program is to understand the neural mechanisms of sensory processing in children with autism and their impact on function and participation. This research aims to characterize and measure sensory reactivity, sensory perception, and multisensory integration using psychophysiological measurement, imaging, multisensory integration-evoked related
potentials, and behavioral measures. Students will work in the sensory integration laboratory to participate in ongoing studies, manage data, and participate in data analysis and interpretation.

Research Opportunities
- Determine patterns of sensory differences (both behavioral and physiological) in children with autism by using a tested algorithm
- Compare patterns of sensory reactivity in autism and other clinical populations
- Explore the feasibility of using Diffuse Tensor Imaging (DTI) and fMRI to measure sensory processing in children with autism.

Evaluation in Ayres Sensory Integration (EASI) (Dr. Zoe Mailloux and Dr. Roseann Schaaf)
Comprehensive assessment is a critical link between understanding an individual’s participation challenges and choosing an intervention that will be effective in supporting that individual toward successful and meaningful engagement in occupations. The EASI aims to be a comprehensive assessment for understanding the ways in which sensory integrative function and dysfunction are supporting or hindering participation in children.

Research Opportunities
Pilot testing on all tests of the EASI in the US will produce large data sets which can be accessed to explore a variety of research questions. In addition, the tests can also be employed in conjunction with other projects. Examples of possible research questions include the following:
- How do functions such as tactile perception, praxis, bilateral integration, etc., change over time (from ages 3-12 year)?
- Do various functions such as balance and ocular control or ideational and imitative praxis correlate?
- What is the relationship between direct measurement of functions tested by the EASI and indirect measures such as parent questionnaires?
- What is the inter-rater and test-retest reliability of the tests?
- What is the concurrent validity of the tests with other measures?
- What is the potential for using the tests as proximal outcome measures?
- What are patterns fond in various clinical populations such as in children diagnosed with ASD, ADHD or LD?

Testing Outcomes of Occupational therapy using Ayres Sensory Integration in Comparison to Behavioral Intervention to Improve Functional Skills in Children with Autism (Dr. Roseann Schaaf and Dr. Zoe Mailloux)
This research focuses on testing the implementation of an evidence-based program of occupational therapy using sensory integration principles. Outcomes include measures of multisensory integration (via ERP), behavior, activity and participation.

Research and Program Development Opportunities
- Video analysis of occupational therapy treatment sessions
• Testing of the parent training manual used in the intervention
• Categorize common parent goals for children with autism and sensory differences using a grounded theory approach
• Analysis of parent-identified needs

*Expanding Recreational Engagement in Kids with Autism Spectrum Disorder (EuREKA Project) (Dr. Potvin)*

Individuals with autism spectrum disorders (ASD) have restricted patterns of participation in recreational activities. They participate in fewer activities, with a narrower range than other people, and closer to home than their same-aged peers. Thus, participation in recreational activities is often compromised in individuals with ASD and may impact quality of life (QoL). The EuREKA Project investigates the effect of an inter-professional approach that combines parent coaching and context therapy (coaching in context) to increase the recreational participation of children with ASD. This manualized, parent-mediated, culturally responsive intervention draws from current empirical evidence across a number of health professions.

*Research and Program Development Opportunities*

The approach is being pilot tested through implementation with various samples of participants. Examples of possible research question questions include the following:

- Estimate the degree of fidelity of implementation of novice, mid-career, and experienced occupational therapists.
- Estimate fidelity of implementation for varied professional
- Explore the efficacy of the approach with various socio-economic or ethnic groups.
- Describe the social validity of the intervention from the participating parent’s perspective.

*Coaching in Context for College Success (C+C Project) (Dr. Potvin and Dr. Gorenberg)*

A growing number of young adult with high functioning autism spectrum disorder are attending college. These young adults are often experiencing challenges with the social and academic aspects of college life. The coaching in context approach designed for the EuREKA Project can be used with young adults attending college to achieve their own academic and social integration goals. The need is clear from the literature. This aspect of the research program is under development.

*Research and Program Development Opportunities*

- Systematic review of the efficacy of coaching approaches with individual with ASD
- Feasibility of using coaching in context with individual with ASD on college campuses
- Identification of common contextual barriers to college success in those with ASD
- Feasibility of using Level 2 OT students to provide coaching in context to young adults with ASD on college campus.
ASD: A Life of Quality (Dr. Potvin)
Individuals with ASD across the life span, and their caregivers, consistently report that people with ASD experience poorer quality of life (QoL) than neurotypical peers and those with other disabilities. This is unexpected as research has found that individuals with chronic, even terminal health conditions, as well as various disabilities do not report experience poorer QoL than healthy adults.

Research and Program Development Opportunities
- How do individuals with ASD define QoL? What do they perceive provides greater and hinders their own quality of life?
- What is the role of resiliency in the perception of quality of life of those with ASD and their families?
- Are common measures of QoL valid with individuals with ASD?
- Compare the QoL of those with ASD and ADHD (secondary analysis of existing data)

Trauma and ASD (Dr. Gorenberg and Dr. Potvin)
Individuals with ASD are at higher risk of experiencing traumatic stress and adverse childhood events that have the potential to impact health and well-being. Children and youth with ASD are more likely to be bullied and to experience serious physical injuries than their typically developing peers. Psychosocial, cognitive and sensory processing differences experienced by individuals with ASD may impact their ability to adapt flexibly to stressful experiences or unexpected experiences or inputs. Specifically, individuals with ASD have differences in sensory processing abilities and social cognition. Both set of challenges may result in a person with ASD experiencing trauma in context or situation when a neurotypical person would not. These same differences may also interfere with adaptive coping in response to traumatic or stressful experiences resulting in increased vulnerability to the effects of trauma.

Research and Program Development Opportunities
- What are risk factors for traumatic stress and related occupational performance challenges in individuals with autism?
- What factors promote resilience and coping in response to traumatic stress?
- What events are experienced as traumatic by individuals with autism?
- Occupational therapy interventions and approaches for supporting adaptive coping in individuals with ASD
- Inter-professional programming to support children and youth with autism and their families who have experienced trauma

Sensory Aware and Friendly Environments (SAFE) (Dr. Mailloux)
We all want to feel comfortable, focused and at ease in all the environments in which we live, work, learn and socialize. Everyone has preferences for the various sensory experiences such as color, sound, scents, texture and the options available for movement and activity. For some individuals, these preferences are more extreme to the point that certain sensations can
actually be painful, distracting and confusing. SAFE is a program under development to assist businesses and organizations in making their facilities and services more sensory aware and friendly.

Research and program Development Opportunities
The SAFE approach can be further developed through both research studies and program development projects. Examples of possible research questions and program development opportunities include the following:

- What are the benefits to businesses and organizations who engage in the SAFE process?
- What are the benefits to consumers who access SAFE businesses and services?
- What elements of the SAFE approach are the most or least effective in a consumer’s view? In a business’s view?

Innovative Design for Engaged Attention and Learning (IDEAL)  Dr. Mailloux
Children are spending more and more time in sedentary activities, with increased hours in front of computer, television and hand-held screens. At the same time, academic expectations are increasing and options for physical activity at parks, playgrounds and recess spaces are diminishing. While these societal trends make is harder for children to engage in the active play their brains and bodies need to grow and develop, we also expect them to sit in stable, 4-legged chairs that are often the wrong size for their bodies. What if they could sit in chairs that adjusted to the correct height and that provided the types of motion and flexibility most adults expect and enjoy in their work furniture? What if classrooms were designed and arranged to support learning needs? Isn’t it time that we all aim for classrooms that support basic sensory and ergonomic considerations for children?

Research and program Development Opportunities
The IDEAL approach can be further developed through both research studies and program development projects. Examples of possible research questions and program development opportunities include the following:

- Exploration of the effects on behavior, attention and learning through the re-design of various sensory elements of classrooms (e.g. lighting, color, temperature, scents, sounds, access to movement, etc.)
- Exploration of ways in which dynamic furniture (i.e. chairs and desks which move) can support or hinder learning and attention
- Exploration of ways in which teacher education and introduction of routines that involve movement and other aspects of sensation can affect student performance.

For more information regarding this lab please visit our website at:

http://www.jefferson.edu/university/health-professions/departments/occupational-therapy/research.html
Selected Publications


Funding Sources

- National Institutes of Health – NICHD
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