

**Author Spotlight – Dr. Olivia Surgent, Ph.D.**

Here, we had the pleasure of learning from Dr. Olivia Surgent about her recently published work in Biological Psychiatry. Dr. Surgent is a postdoctoral fellow in the Autism Research Training Program at the MIND Institute, UC Davis. Her research takes an interdisciplinary approach to examining the neurobiological mechanisms underlying behavior in children and young adults on the autism spectrum.

How did you first start thinking about this research question? What was the spark?

My research focuses on the neural mechanisms of sensory and motor differences in autism. Before starting this project, I knew that many autistic children experience fine motor challenges and that the trajectories of fine motor development are distinct in males

versus females. However, because autistic girls are often underrepresented in neuroimaging research, it was unclear how sex assigned at birth influenced the neurobiological underpinnings of fine motor development in autism. The spark for this study came when I gained access to a unique longitudinal dataset that could directly address this gap in our understanding of the mechanisms of motor development in autism.

Tell us about your work in this paper – what was your study design?

This work leveraged a study at the University of California Davis MIND Institute, the Autism Phenome Project (APP), which has been collecting longitudinal data from autistic children since 2006. Children enter the study between two and three years old and participate in behavioral and motor assessments, as well as a non-sedated MRI scan during natural nocturnal sleep. They are invited to return at four additional timepoints through age 18, making the APP an incredibly rich dataset that can answer a variety of questions about childhood development in autistic youth. While autism is often reported to have a 4:1 male to female ratio, the APP has a strong representation of autistic females (2:1 male to female), facilitating investigation of how sex assigned at birth influences brain-behavior relationships. For this study, we used APP data to determine how structural features of brain networks at age three are differently associated with motor development in autistic boys, autistic girls, and non-autistic children.

What was the central finding? Why was this important?

Our central finding was that early childhood development of brain structures associated with sensory processing is differently associated with concurrent fine motor behavior and fine motor developmental trajectories in autistic girls compared to autistic boys. This suggests that the way the brain lays the foundation for motor development may be sex-specific, which could have important implications for how we approach motor challenges in autistic youth.

Is there a little nugget buried in the results section that most readers might not notice?

One of the most interesting aspects of our results is their specificity. We found diagnosis-dependent and sex-specific associations among fine motor skills and sensorimotor-affiliated brain structures. However, we did not find significant associations with brain structures involved in cognitive aspects of motor control nor did we find associations with overall developmental status. These findings were consistent across two brain imaging techniques: one measuring the volume of brain structures and the other white matter microstructural properties. Together, this suggests that early childhood development of sensory-based brain networks may play a

uniquely important role in laying the foundation for the fine motor skill differences often found in autistic girls and boys.

What's next for your research?

I'm excited to continue to explore how sensory and motor brain networks set the stage for developmental differences in autism. Sensory and motor differences are often overlooked in autism-based neuroscience research, which commonly focuses on group-level differences (autistic vs non-autistic participants) or individual differences in core autism diagnostic domains (social communication, restricted interests, or repetitive behaviors). Yet, early differences in how the brain processes sensorimotor information may substantially influence the development of behaviors commonly associated with an autism diagnosis. Therefore, I am particularly interested in learning more about how brain development gives rise to early sensorimotor experiences and ultimately contributes to the heterogeneous behavioral profiles found across the autistic population.

What do you most enjoy about the SOBP meeting?

I always love the chance to share my work with other scientists who are passionate about translational, interdisciplinary research with clinical implications. The SOBP meeting is a wonderful opportunity to do just that.

Read the full details of her work here:

Surgent, O., Andrews, D.S., Lee, J.K., Boyle, J., Dakopolos, A., Miller, M., Ozonoff, S., Rogers, S.J., Solomon, M., Amaral, D.G., Nordahl, C.W. Sex differences in the striatal contributions to longitudinal fine motor development in autistic children. *Biological Psychiatry*, <https://doi.org/10.1016/j.biopsych.2025.01.005>