

Hannah R. Thomas

Personal Statement

As a clinical scientist in training, my favorite days usually begin blowing bubbles with a preschooler and end troubleshooting our electroencephalogram (EEG) processing pipeline. Despite the clear contrast between these activities, the fulfillment I get through a directed smile from a preschooler and cracking a code to get a script running are qualitatively equivalent. This omnivorous curiosity has been the driving force in all my endeavors in the psychology field. Moreover, my goal as a scientist-practitioner is to join these interests and use neuroscience methods to inform clinical practice for children with neurodevelopmental disorders. I believe the clinical psychology program at the University of Connecticut under the supervision of Dr. Inge-Marie Eigsti provides the optimal environment for my interests to coalesce.

Being the youngest of four and the first person in my family to leave our hometown in rural Indiana, my decision to attend the University of South Carolina (USC) was one I had to advocate for on my own. With the help of scholarships and unwavering persistence, I was able to accept my offer and move eleven hours away. This self-motivation and determination are what have allowed me to excel in my studies, take my education far beyond the classroom, and continues to drive me to acquire the training necessary to be both a better clinician and researcher. At USC, I pursued research at the Neurodevelopmental Disorders Lab under the supervision of Dr. Jane Roberts. In studying and working with children with autism spectrum disorder (ASD) and fragile X syndrome, I gained a great appreciation for clinical work and was eager to acquire more hands-on clinical experience in working with children. This led me to join Dr. Scott Decker's Applied Cognitive Neuropsychology Lab where I had the opportunity to administer cognitive and academic assessments and collect resting-state EEG data from children with various neurodevelopmental disorders such as learning disabilities and ADHD. While working in both labs, I submitted grants and received independent funding from our undergraduate research office to pursue my own research ideas. Within Dr. Roberts' lab, I explored language and cognition as predictors of social communication change in children with fragile X syndrome. To do so, I collected original data using a standardized coding scheme from video samples of young children with fragile X syndrome. While conducting this study, I became more interested in developmental trajectories and factors that contribute to successful outcomes in clinical populations. Furthermore, with Dr. Decker, I investigated cognitive and neural deficits in children with dyslexia using

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both behavioral testing and resting-state EEG coherence data. Both of these opportunities allowed me to embark on the research process as a whole; from hypothesis and proposal to interpretation and presentation, and contributed to my desire to combine behavioral and neuroscience methods to study communicative behaviors and language development in individuals with ASD.

While these experiences were clinically and behaviorally fulfilling, I still yearned to gain more focused training within neuroimaging methodology. Thus, I pursued advanced coursework and worked with Dr. John Richards, which solidified my passion for neuroscience. Under Dr. Richards' supervision, I had the opportunity to partake in the data collection, processing, analysis, and interpretation of an MRI-constrained EEG source localization study of face processing. This multi-modal approach provided me with insight into the strengths and limitations of these methods. Additionally, we were given the chance to participate in the study ourselves, which further fostered my appreciation and understanding of experimental design within neuroscience. A consideration particularly important for clinical populations, such as ASD, in which subject comfort is crucial. As I prepared to take my next steps and pursue further research experience, I sought out positions that would allow me to combine my two complementary interests; working with children with neurodevelopmental disorders and utilizing neuroscience methodology.

My current role at the Center for Autism and the Developing Brain (CADB) working with Dr. So Hyun "Sophy" Kim has been the ideal environment to do just that. At CADB, I work as the lead coordinator on a longitudinal study of school readiness in kindergarteners with ASD, using both behavioral assessment and an EEG go/nogo task. Immediately upon joining the study, I sought out training in the processing and analysis of our EEG data with the hopes of eventually leading an independent project. After closely working with our collaborators, I was able to execute and submit a first authorship oral presentation to an international conference. The project investigated traditional ERP components and advanced time-frequency decompositions associated with cognitive control to explore possible differences between children with ASD and their typically developing peers. Our findings indicated impairments in the later component of cognitive control, control recruitment, through decreased theta-power in medio-frontal regions within the ASD group. The importance of these results was supported by the significant correlation between this component of

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cognitive control and academic achievement in these children, suggesting targeted interventions in this domain may promote more successful outcomes. While gaining these fundamental skills in data collection and processing was essential to this work, it was the later steps in the process that truly resonated with me. Bridging the gap from neural measurement to clinical implications to create a meaningful story for the benefit of this population was an invaluable experience, and an application of research I hope to continue in my future studies. More specifically, I would be interested to see how neural networks contribute to other domains in ASD, such as social communication deficits.

Anecdotally, while working with these children I could not help but notice that other symptomologies were presenting behaviorally alongside their ASD manifestation. Specifically, I observed that possible ADHD and anxiety symptoms appeared to have additive effects on their social difficulties and adaptive functioning. My interest in comorbidities serendipitously aligned with an opportunity to join Dr. Adriana DiMartino's team investigating the behavioral and neural correlates of ASD and ADHD. Within this study, I serve as a blinded clinician and administer child diagnostic and cognitive measures. Following the assessment, I convene with a parent interviewer and summarize both sides of the story; developmental history and behavioral observation, to ultimately discuss differential diagnosis. Finally, I present the case to clinicians of various disciplines to confirm diagnostic opinions and provide clinical recommendations. I also attend workshops and meetings on the preliminary analyses of neural correlates between these groups, specifically in regard to the impact of ASD traits on functional connectivity. This rich clinical experience of forming my own diagnostic opinions and presenting them professionally has instilled me with more confidence in my potential as a clinician, and determination to become a great one. Likewise, learning about the similarities and differences in the neural networks between these groups has further fueled my curiosity in the intricate and heterogeneous profiles of children with ASD.

As I am applying to doctoral programs as the first in my immediate and extended family to pursue graduate-level education, I appreciate now more than ever the humbling experience of embarking on such opportunities independently and continuing to pursue them despite any obstacles and reservations. However, this time around, it is not just my own curiosity that is driving me, but rather the possibility of combining my

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interests and using them to improve the lives of children who I love working with that continually reassures me I am on the right path. At the University of Connecticut (UCONN) with Dr. Eigsti's mentorship, I believe my two passions of clinical neuroscience and working with the ASD population would come together seamlessly. More specifically, I am very interested in work on the trajectories of individuals with autism, and exploring the neural networks and behavioral factors, such as language, that contribute to these outcomes. Additionally, I am interested in the possibility of targeting domains of language in interventions to promote more successful outcomes. This, alongside the clinical program at UCONN, parallels my own desire to grow as both an effective clinician and an impactful researcher. Furthermore, I am especially excited about opportunities at UCONN such as the Cognitive Neuroscience of Communication and the Science of Learning and Art of Communication training programs that would further embellish my graduate studies. As I continue my training in this fulfilling field, I will always be inspired by turning days that start with blowing bubbles and end with writing codes into meaningful research and improved clinical practice.